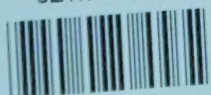


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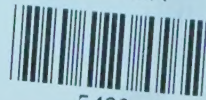
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E O a D

# THE ROLLING MILL



**DEUTSCHE  
MASCHINENFABRIK A.G.  
DUISBURG**

TELEPHONE: AMT I  
Nos. 4535 TO 4549

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# C O N T E N T S

## I.

### THE BLOOMING MILL

1. From the Soaking Pit to the Rolling Mill..... Pages 1– 5
2. Machines and Cranes for serving the reheating furnaces..... Pages 6–17
3. The Cogging Mill..... Pages 18–32
4. Manipulators for Blooms..... Pages 33–38
5. Rolling Mill Engines..... Pages 39–58
6. Electric and Hydraulic Bloom Shears..... Pages 59–68
7. Transporting and Loading Plants for Blooms and Billets ..... Pages 69–76
8. Compressed Air as a Motive Power in Rolling Mills Pages 77–82

## II.

### ROLLING MILLS FOR RAILS, GIRDERS AND SECTIONS

1. Rolling Mills for Rails, Girders and Sections.... Pages 83– 98
2. Cranes for Transporting Rolls..... Pages 99–104
3. Stationary and Travelling Roller Gears and Lifting Tables ..... Pages 105–111
4. The Finishing Process for Rolled Sections..... Pages 112–122
5. The Loading Bank for Sections..... Pages 123–138



# C O N T E N T S

E.O.D

## III.

### MEDIUM AND SMALL SECTION ROLLING MILLS

1. From the Bloom and Billet Depots to the Medium and Small Section Rolling Mills ..... Pages 139–149
  - a) Electric Travelling and Stationary Ingot Pushing Devices ..... Page 143
  - b) Hydraulic Ingot Pushing Devices ..... Page 149
2. The Rolling Mill for Medium and Small Sections Pages 150–160
3. The Double Two High Mill ..... Pages 161–166
4. The Continuous Rolling Mill ..... Pages 167–172
5. Cutting, Cooling and Straightening Medium and Small Sections ..... Pages 173–182
6. Loading Plants in the Medium and Small Section Stores ..... Pages 183–188

## IV.

### THE COLD ROLLING MILL

1. The Cold Rolling Mill ..... Pages 189–195
2. Rolls of Hardened and Polished Cast Steel.... Page 196



# C O N T E N T S

## V.

### T H E W I R E M I L L

1. The Wire Mill..... Pages 197–202
2. The Coiling Machines..... Pages 203–206

## VI.

### ROLLING MILL FOR ORDINARY PLATES AND ARMOUR PLATES

1. The Rolling Mill for Ordinary Plates and Armour Plates ..... Pages 207–224
2. The Finishing Process in the Plate Rolling Mill Pages 225–236
3. The Electric and Hydraulic Machines for working Ordinary Plates and Armour Plates ..... Pages 237–252

## VII.

### T H E S H E E T R O L L I N G M I L L

1. The Sheet Rolling Mill..... Pages 253–257
2. Lifting Magnets for transporting Sheets ..... Pages 258, 262
3. Pickling in the Sheet Rolling Mill ..... Pages 259–261



# C O N T E N T S

## VIII.

### THE UNIVERSAL ROLLING MILL

1. From the Slab Stores to the Rolling Mill ..... Pages 263–269
2. The Universal Rolling Mill ..... Pages 270–284
3. The Finishing Process in the Universal Rolling Mill Pages 285–298

## IX.

### THE TUBE ROLLING MILL

1. Apparatus for making Seamless Tubes ..... Pages 299–317
2. Welded and Corrugated Tube Rolling Mill..... Pages 318–322
3. The Finishing Process in the Tube Rolling Mill. Pages 323–325
4. Hydraulic Presses for making and working Tubes  
and other Hollow Objects ..... Pages 326–334

## X.

### THE DISC AND TYRE MILL

1. Forging Presses and Steam Hammers ..... Pages 335–339
2. The Disc and Tyre Mill ..... Pages 340–348



# C O N T E N T S

## XI.

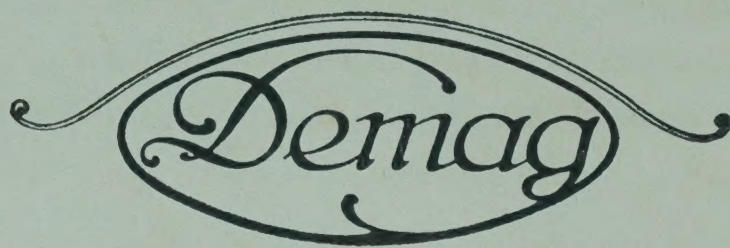
### THE ROLL FOUNDRY, TURNING AND MACHINE SHOP

The Roll Foundry, Turning and Machine Shop.... Pages 349–360

## XII.

### THE MANUFACT. OF GEAR WHEELS

The Manufacture of Gear Wheels..... Pages 361–366





# P · R · E · F · A · C · E



he tremendous and ever-increasing demands made upon the efficiency of rolling mills have been a most important factor in the development of the latter and of the necessary auxiliary machines. If we compare the first rolling mills, which were built at the close of the seventeenth century or the one designed and built by Heinrich Kamp in the year 1827 at our own works at Wetter o. Ruhr with the modern plants of the present day, the extraordinary progress accomplished in this branch will be evident.

## “THE ROLLING MILL”

owes its origin to the call for cheaper and better means of producing iron plates, which, up to the middle of the 18<sup>th</sup> century, were forged solely under the hammer. The good results obtained with the above mentioned plants after many obstacles had been overcome and led to the erection of bar iron rolling mills. These plants, too, showed that the cost of producing bar iron was considerably lower than by the old process of drawing out the iron by means of hammers, and this was an inducement to produce other objects by means of rolling mills. In course of time the present enormous rolling mill industry with its comprehensive programme has developed out of these small beginnings.

In the construction and finish of up to date rolling mills required for the production of plates our firm has achieved great things. The construction of the necessary auxiliary machines and transporting plants progressed simultaneously with the constant improvements in the rolling mills and their adaptation to the quantity and description of the output.

There has been a very considerable increase in the demand for bar iron and wire. Of course, the first bar iron rolling mills mentioned above had a very low output, owing to the simplicity of their construction and the small hydraulic power used for driving them. After the



introduction of steam driving and the improvement in the design it was possible to increase the output to suit the requirements of the market. In course of time the rolling mills, formerly so simple, developed into extensive plants with manifold auxiliary machines, which yielded quite a respectable output. But even these plants were unable to cope with the constantly increasing demand for sections, small iron and wire, particularly on account of the lack of suitable hands that gradually made itself felt, so that efforts had to be made to further replace manual labour by machinery. The erection of continuous rolling mills resulted in a considerable saving of workmen, while the production was at the same time greatly increased. These rolling mills, which originated from America, were newly improved by German inventors in order to adapt them to the manifold demands of European markets and were employed with great success by the steel works.

The prominent part which our firm took in the development and introduction of these continuous rolling mills may be gathered from the fact that during the last decade we have designed 25 continuous mill trains, which have been built in our workshops. The efficiency of these plants is hardly to be surpassed, especially if continuous cogging mills are suitably combined with finishing mills as is required when the work of the rolls covers a large range of different sections. As an example it may be worth while mentioning that in a rolling mill plant contrived by us on the aforesaid principles 350 tons of small iron bars of 6 to 40 mm. diameter, or corresponding sections, are made in an ordinary shift, and on a wire mill 250 tons of wire 5 mm. in diameter in the same time.

The demand for all kinds of sections, such as rails, sleepers, girders etc. has increased in a similar proportion as that for bar iron and wire. In this branch especially the scarcity of hands and the greater weight of rolled material to be reckoned with led to the application of mechanical auxiliary appliances. In connection with this we should like to mention the travelling lifting tables with tilters attached, a large number of which has been built by us.



**I**n view of the increased demand for finished material, great expectations were raised in the efficiency of the blooming mills used in the manufacture of the half-finished products and the outcome of these requirements was an extensive remodelling and constant improvements in the design of these machines. The improvement in the quality of the finished products, called for as time went on, necessitated a better preparation of the rolled goods, and consequently required ingots of a larger section, i. e., of greater weight. The result was that the dimensions of the cogging mills were constantly becoming larger and stronger, and suitable mechanical devices had to be resorted to which abolished the old system of serving by hand. The large number of cogging mills delivered by us proves beyond doubt how well we accomplished this task.

**F**or a large number of years we have not only occupied ourselves with the rolling mills already mentioned, but also with the construction of rolling mills for the production of special articles. With reference to the vast quantities of the products made by these special rolling mills we may mention as the leading one the Universal Rolling Mill. Our predecessors, Messrs Kamp & Co., Wetter, erected a large number of these rolling mills about the middle of the last century. At that time tube-strips were chiefly manufactured by means of these rolling mills. With the increasing application of steel for constructional purposes the demand for universal iron grew considerably, and the larger quantities of material to be produced necessitated bigger, more powerful and better designed rolling mills. The application for constructional purposes rendered it necessary to design suitable straightening machines, and in this branch we took the lead. The great interest we have taken in the study and erection of Universal Rolling Mills becomes apparent by the fact that we have already built more than 90 such mills. As the manufacture of tinplate has also developed into a big industry pickling and tinning apparatus have since a number of years been included amongst our specialities.

**T**he extension of the network of railways and the growth of passenger and goods traffic made it necessary to have an enormous rolling stock of engines and carriages, as well as to enlarge existing



plants and build new ones for the manufacture of wheels and axles. The manufacture of disc and tyre mills required for this purpose, and of steam hammers, presses and auxiliary machines appertaining thereto, has been part of our programme for many years.

**F**or the manufacture of hoops of steel, brass, copper, lead, tin, zinc etc., which are required of the most varied thicknesses and widths by the electrical and cable industries and for punching purposes, cold rolling mills are employed. Particular care has been devoted to this branch, and for many years we have successfully built and erected the necessary rolling mills and auxiliary machines. We attached special importance to the introduction of high speed rolling mills in order to increase the output, at the same time diminishing the prime cost of the rolled material.

**Q**uite as manifold as the shapes, dimensions and applications of the tubes and hollow products of forged steel, copper alloys etc. are the machines and rolling mills employed in their manufacture. In consequence of the exceedingly great and ever-increasing demands on the output and safe working of the machines and appliances used to-day in factories, shipping, aeronautics and traffic, hollow products of pressed or rolled steel are mostly asked for, in order to be transformed into smooth and corrugated boiler shell rings, turbine cylinders, air-vessels for storing and transporting compressed air of high pressure etc., guns, conduits for naphtha, petroleum, water and steam, hoists and bearing poles, circulating and precision tubes for airships, motor cars and bicycles. The manufacture of these articles requires long years of experience and lays great claims on the suitable design as well as to the substantial construction of the manifold rolling mills required. A thorough study and steady and persistent work have enabled us to overcome all obstacles, and to-day we are able to refer to numerous plants erected by us. Owing to the multiplicity of the programme it may be presumed that this branch will still undergo further development.

**I**n the following pages we give a fairly large number of the most varied kinds of rolling mills and transporting plants made by us and, for the purpose of illustrating the development in this branch, not only



up-to-date, but also older types, insofar as they are of interest to the expert. For the sake of lucidity we have arranged in the present catalogue the examples of the various constructions in such a way as to follow the process of working the ingot coming from the steel works on its way through the furnaces to the blooming mill and from here to the girder, rail, billet or plate rolling mill. We then show how, after being reheated, the cogged bloom or billet is rolled down in the medium and small section mills and in the wire mills, then taken to the finishing shop and how, when finished, the rolled material is finally loaded. Our catalogue also includes, in proper order, the examples of the various types of driving engines, special rolling mills, transporting and auxiliary machines, so that the expert may get a good idea at a glance.

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# INDEX

- Accumulator, Weight ..... 67  
 Armour plate bending press, Hydraulic 245  
 Armour plate planing machine ..... 240  
 Armour plate rolling mill ..... 207-224  
 Armour plates, Machines for ..... 237-252  
 Attachment of the top roll ..... 28  
 Automatic oscillating table, Demag Syst. 278  
 Automatic perforating machine ..... 243  
 Bar iron, Loading crane for ..... 184-188  
 Bar iron, Three-high rolling mill for 90-153  
 Bar mill, Finishing department in the 112-122  
 Bending machine, Combined straight-  
 tening and ..... 238  
 Bending machines, Heavy plate ..... 242  
 Bending press, Hydraulic armour plate 245  
 Bevel wheel gear ..... 362  
 Bevel wheels for universal rolling  
 mills ..... 364-365  
 Billet and sheet bar rolling mill, Contin. 168  
 Billet cars, Electric locomotive for drawing 72  
 Billet cooling device ..... 72  
 Billet feed ..... 144  
 Billet mill, 850 mm. two-high ..... 200  
 Billet mill, Continuous ..... 171  
 Billet mill, coupled, Blooming mill with 30-31  
 Billet mill, Two-high ..... 20  
 Billet shifting contrivance ..... 72  
 Blooming mill ..... 20, 22, 23  
 Blooming mill, Reversible ..... 24-29  
 Blooming mill, Two-high reversing ..... 19  
 Blooming mill coupled with billet mill 30, 31  
 Boiler pipe press, Hydraulic ..... 329  
 Bracket crane for transporting sheets... 233  
 Butt welded tubes ..... 318  
 Capstan, Electric ingot withdrawing .... 145  
 Cast steel rolls, Hardened and polished 196  
 Centring device, Ingot ..... 317  
 Chain smithy ..... 355  
 Charging machine, Ingot ..... 14, 15, 143  
 Charging crab, Ingot ..... 12  
 Charging crane, Ingot ..... 12, 13, 146-148  
 Charging crane, Slab ..... 266-269  
 Charging machine ..... 209  
 Claw crane ..... 120, 122, 182  
 Claw crane for transporting billets ..... 73  
 Cleansing machine ..... 195  
 Cogging mill ..... 18-32  
 Cogging rolls, Travelling crane conveying 101  
 Coil, cold rolling mill with ..... 195  
 Coil, hoop iron ..... 177  
 Cold rolling installation for hoops .... 190  
 Cold rolling mill ..... 189-196  
 Cold rolling mill for special purposes .. 192  
 Cold rolling mill with direct motor drive 193  
 Cold rolling mill, with simple counter-shaft 190  
 Cold rolling mill with coil ..... 195  
 Cold rolling mill with water cooling ... 194  
 Cold saw, Electric ..... 350, 351, 354  
 Combined shearing and punching  
 machine for plates and sections .... 353  
 Combined straightening and bending  
 machine ..... 238  
 Compressed air plant ..... 80, 81  
 Compressors ..... 80, 81  
 Continuous billet and sheet bar rolling  
 mill ..... 168  
 Continuous billet mill ..... 171  
 Continuous rolling mill ..... 167-171  
 Continuous rolling mill for small ingots 170  
 Continuous roughing mill .... 152, 170, 171  
 Continuous roughing mill for small section  
 mill ..... 158, 169-171  
 Continuous tube rolling mill. 301, 306-309  
 Cooling beds, Mechanical ..... 176-178  
 Cooling device, Billet ..... 71  
 Cooling trough for billets with skid attached 70  
 Copper rails and bars, Rolling mill for. 155  
 Copper sheet rolling mill ..... 222, 255  
 Copper tubes, Piercing mill for ..... 305  
 Copper wire mill ..... 202  
 Corrugated plates, press for ..... 244  
 Corrugated tube rolling mill ..... 312  
 Coupling, Hydraulic main ..... 38  
 Coupling, Spindle housings connected  
 to main ..... 21  
 Cover-lifter for tyre soaking pit crane.. 343



# INDEX

- Crab for conveying ingots, Monorail ... 5
- Crab for transporting discs, Monorail .. 348
- Crane, Claw ..... 120, 122, 182
- Crane, Electric roll changing locomotive slewing ..... 100
- Crane for rolled sections, Loading 123-137
- Crane for transporting plates, Bracket .. 233
- Crane in a power station, Overhead travelling ..... 53-55
- Crane, Ingot ..... 142
- Crane, Magnet ..... 141, 142
- Cranes in the roll foundry ..... 350, 351
- Cranes, Rolling mill ..... 99-104
- Crane, Soaking pit ..... 343
- Crane, stripping ..... 3
- Crane with slewing jib for loading rolls, Overhead travelling ..... 104
- Crank roller gear ..... 31
- Curving machine for corrugated plates, Electric equalising and ..... 244
- Discs, Monorail crab for transporting .. 348
- Double cold rolling mill ..... 191
- Double frame plate shearing machine 229, 230
- Double helical teeth, Pinions with ..... 363
- Double lever punching machine ..... 241
- Double shearing machine ..... 182
- Double shearing machine for sections .. 122
- Double wire coil with pointing machine 179
- Double two-high mill for tool steel .... 163
- Double two-high mill in the medium section rolling mill ..... 161-165
- Doubling shears for sheets ..... 257
- Drawing press, Heavy hydraulic ..... 328
- Drawing press, High speed ..... 327
- Drills, Pneumatic hammer ..... 78, 79
- Drive of a rolling mill, Electric ..... 53
- Driver's stand, Combined crab and .... 101
- Eccentric shearing machine ..... 180
- Edenborn wire coiling machine ..... 205
- Electric cold saw ..... 350, 351, 354
- Electric drive of a rolling mill ..... 53
- Electric equalising and curving machine for corrugated plates ..... 244
- Electric ingot withdrawing capstan ..... 145
- Electric starting gear ..... 56, 57
- Electric travelling tipping carriage ..... 17
- Electro-pulley block ..... 206, 233, 354
- Equalising and curving machine for corrugated, plates, Electric ..... 244
- Expanding fire tubes, Hydraulic press for 329
- Feed roller gear with deep level lip .... 274
- Finishing mill ..... 93
- Finishing mill, Continuous roughing mill with ..... 152, 158
- Finishing plates and armour plates 237-252
- Finishing process in the sect. roll. mill 112-122
- Finishing process in the plate rolling mill ..... 225-236
- Finishing process in the universal rolling mill ..... 285-298
- Finishing sets of wheels ..... 347
- Finishing shop, Tube ..... 325
- Fire tubes, Hydraulic press for expanding 329
- Flanging press, Hydraulic ..... 247, 248, 250
- Flanging press, Steam hydraulic ..... 246
- Flat iron shearing machine ..... 180
- Forged pinions, Working ..... 363
- Forging press for fore-forging tyres and discs ..... 336
- Gantry crane for transporting rolls .... 103
- Gas engine for driving a rolling mill ... 52
- Gear, Crank roller ..... 31
- Girder and section rolling mill ..... 83-138
- Girder reversing mill, Erection of a .... 86
- Girder rolling mill, Heavy two-high . 84, 85
- Graduating press, Hydraulic ..... 330
- Hammer drills, Pneumatic ..... 78, 79
- Heavy plate bending machine ..... 242
- High level lip, Sheet bar skid and ..... 290
- Hollow blocks for normal seamless tubes, Piercing mill for ..... 304, 305
- Hoop iron coil ..... 177
- Horizontal three plunger press ..... 66
- Hot banks ..... 116-118, 120
- Hot banks with skid, Plate ..... 226-228
- Hot bank, Universal iron ..... 292, 293



# INDEX

Hot bank with sheet turning over device ..... 227, 228  
 Hot saw Sliding ..... 113-117  
 Hot shearing machine with roller gear 151, 152  
 Housings ..... 221  
 Housings, Finishing the ..... 224  
 Housings for cogging mills ..... 23-26  
 Housings, Grooved rail ..... 96  
 Housings, Two-high cogging and pinion 32  
 Housings with hydraulic adjustment .... 25  
 Hydraulic armour plate bending press . 245  
 Hydraulic flanging press ..... 246  
 Hydraulic calibrating press ..... 330  
 Hydraulic high-speed drawing press .... 327  
 Hydraulic ingot pushing device ..... 149  
 Hydraulic main coupling ..... 38  
 Hydraulic manhole shearing machine .. 249  
 Hydraulic pipe pressure testing mechan. 331  
 Hydraulic plate-bending press, Vertical . 251  
 Hydraulic plate straightening machine 252, 257  
 Hydraulic presses for making tubes 326-333  
 Hydraulic press for leaden pipes ..... 328  
 Hydraulic press for expanding fire tubes 329  
 Hydraulic riveting machine ..... 243  
 Ingot centring device ..... 317  
 Ingot charging carriage ..... 14, 15, 144  
 Ingot charging crab ..... 12  
 Ingot charging crane ..... 12, 13, 146-148  
 Ingot crane ..... 142  
 Ingot cranes for serving the reheating furnace ..... 7  
 Ingots, Monorail crab for conveying ... 5  
 Ingots, Overhead travelling crane for conveying ..... 10, 11  
 Ingot pushing device, Hydraulic ..... 149  
 Ingot pushing device, Travelling ..... 143  
 Ingot pushing device, Stationary electric 143  
 Ingot pushing machine, Electric ..... 7-9  
 Ingot shearing machine, Electric ..... 60-63  
 Ingot shearing machine, Hydraulic 64, 65, 68  
 Ingot shearing machine, Steam hydraulic 66, 67  
 Ingot tipper, Electric ..... 29  
 Ingot transporting cranes ..... 75

Ingot withdrawing capstan, Electric ..... 145  
 Jib crane for transporting ingots ..... 10  
 Lap welded tubes ..... 319  
 Lathe, Roll ..... 352, 353  
 Leaden pipes, Hydraulic press for ..... 328  
 Lever punching machine with table .... 241  
 Lifting device for lifting tables ..... 218  
 Lifting magnet, Ingot transporting crane with ..... 11  
 Lifting magnet for transporting plate scrap 262  
 Lifting tables, Lifting device for ..... 218  
 Lifting table with tilting device ..... 107  
 Loading crane for plates and universal iron 297  
 Loading cranes for bar iron ..... 184-188  
 Loading bank cranes ..... 123-137  
 Locomotive for drawing billet cars, Electric ..... 72  
 Magnet crane for loading scrap ..... 166  
 Magnet crane for plates ..... 234, 235  
 Magnet cranes for transporting heavy articles ..... 138  
 Magnet cranes for transporting blooms ..... 74-76, 141, 142  
 Magnet for loading turnings ..... 360  
 Magnet transporting sheet scrap ..... 262  
 Magnet transporting sheets in cases .... 258  
 Magnetic cover-lifter, Soaking pit crane with ..... 5  
 Mandrel upsetting press, Hydraulic ..... 329  
 Manhole shearing machine, Hydraulic .. 249  
 Manipulator, Electric ..... 33, 34, 36, 37  
 Manipulator, Hydraulic ..... 35  
 Mechanical cooling beds ..... 176-178  
 Medium bar rolling mill of 4 housings 156  
 Medium bar rolling mill of 7 housings, Three-high ..... 158  
 Medium bar rolling mill, Three-high 151, 152  
 Medium section double two-high mill 161-165  
 Medium sections, Shearing machine for 181  
 Metal bands, Straightening machine for 192, 193  
 Monorail crab for conveying ingots .... 5  
 Monorail crab for transporting discs ... 348  
 Monorail crab for transporting rolls 100, 101



# INDEX

Old-fashioned rolling mill engine ... 39, 40  
 Old-fashioned starting gear ..... 57  
 Old-fashioned universal rolling mill .... 270  
 Oscillating tables, Electric ..... 150  
 Oscillating tables for universal mill ..... 275  
 Oscillating tables, Stationary ..... 110  
 Oscillating table, System Demag, Automatic ..... 278  
 Overhead travelling crane for conveying ingots ..... 10, 11  
 Pendulum saw, Electric ..... 118  
 Perforating ingots, Press for ..... 300  
 Perforating machine, Automatic ..... 243  
 Pickling plant for sheets ..... 260, 261  
 Pickling shop, Driving engine for ..... 261  
 Pickling shop in the sheet rolling mill .. 259  
 Piercing mill for copper tubes ..... 305  
 Piercing mill for seamless tubes ..... 304  
 Pilgrim tube rolling mill ..... 310-313  
 Pilgrim tube rolling mill, Demag System 302  
 Pinion housings ..... 32, 191  
 Pinion rings ..... 366  
 Pinions for three-high spindle housings 160  
 Pinions with double helical teeth ..... 363  
 Pinions with milled teeth, Wrought steel 95  
 Pipe pressure testing machine, Hydraulic 331  
 Pipe upsetting press, Hydraulic ..... 330  
 Planing machine, Armour plate ... 239, 240  
 Plates and armour plates, Machines for ..... 237-252  
 Plate bending presses, Vertical hydraulic 251  
 Plate edging machine ..... 239, 240  
 Plates, Magnet crane for ..... 234, 235  
 Plate mill housings, Two-high .... 217, 229  
 Plate rolling mills ..... 212-223  
 Plate rolling mill, Finishing process in the ..... 225-236  
 Plate shearing machine, Two standard electric ..... 229, 230  
 Plate shearing machine with double gap 236  
 Plate straightening machine... 231, 232, 257  
 Plate straightening machine, Hydraulic 252, 257  
 Plate turning over device ..... 216, 227, 228

Pneumatic hammer drills ..... 78, 79  
 Pneumatic tube pusher and filter ..... 316  
 Pointing machine, Double wire reel with 179  
 Power lever, Electric ..... 111  
 Power lever, Three-high mill with stationary ..... 92  
 Power lever, Three-high mill with travelling ..... 93  
 Presses, Vertical hydraulic plate bending 251  
 Presses for making tubes, Hydraulic 326-333  
 Press for leaden pipes, Hydraulic ..... 328  
 Press for perforating ingots ..... 300  
 Press for sections, Straightening ..... 121  
 Press, High-speed drawing ..... 327  
 Press, Horizontal three plunger ..... 66  
 Press, Hydraulic boiler pipe ..... 329  
 Press, Hydraulic mandrel upsetting ..... 329  
 Pressure pump, Three plunger ..... 67  
 Projectile presses ..... 332, 333  
 Pump, Three plunger pressure ..... 67  
 Punching machine ..... 122, 241  
 Punching machine, Combined plate and section shearing and ..... 353  
 Rail, girder and section rolling mill 83-138  
 Rail housings, Grooved ..... 96  
 Reducing rolling mill for seamless tubes ..... 314, 315  
 Reel with pointing machine, Double wire 179  
 Reheating furnaces, Machines and cranes for serving the ..... 6-17  
 Reversible blooming mill ..... 24-29  
 Reversing girder mill ..... 86  
 Reversing mill, Two-high ..... 19  
 Reversing plate mill, Two-high .... 212, 217  
 Reversing slab mill ..... 216  
 Riveting machine, Hydraulic ..... 243  
 Roller changing locomotive slewing crane 100  
 Roller gear for round ingots ..... 303  
 Roller gear with hot shearing machine. 151  
 Roller gear, Crank ..... 31  
 Roller gears and lifting tables, Travelling ..... 105-111  
 Rolling installations for hoops, Cold ... 190



# INDEX

Rolling mill, Continuous ..... 167-171  
 Rolling mill cranes ..... 99-108  
 Rolling mill, Double cold ..... 191  
 Rolling mill, Electric drive of a ..... 53  
 Rolling mill engine, Old-fashioned ... 39, 40  
 Rolling mill, Old-fashioned universal... 270  
 Rolling mill, Ordinary plate and armour  
 plate ..... 207-224  
 Rolling mill engines ..... 39-53  
 Rolling mill for copper sheets ..... 255  
 Rolling mills for sheets ..... 253-258  
 Rolling mill, Two-high plate ..... 220  
 Rolling mill, Two-high reversing ..... 19  
 Roll lathe ..... 352, 353  
 Rotary shears ..... 174, 175  
 Roughing mill ..... 92  
 Roughing mill, Continuous ... 158, 169-171  
 Roughing mill, Double two-high mill with 162  
 Saw Electric cold ..... 350, 351, 354  
 Saw, Electric pendulum ..... 118  
 Saw, Sliding hot ..... 113-117  
 Scrap reel ..... 178  
 Scrap, Wire winding machine for ..... 205  
 Seamless tubes, Piercing mill for... 304, 305  
 Seamless tubes, Reducing mill for . 314, 315  
 Shearing and punching machine, Combi-  
 ned plates and sections ..... 353  
 Shearing machine, Double ..... 182  
 Shearing machine, Eccentric ..... 180  
 Shearing machine, Electric sections ..... 114  
 Shearing machine, Flat iron ..... 180  
 Shearing machine for medium sections. 181  
 Shearing machine for sections, Double . 122  
 Shearing machine, Hydraulic manhole . 249  
 Shearing machine Rotary ..... 174, 175  
 Shearing machine, Steam hydraulic .. 66, 67  
 Shearing machine, Swing ..... 172  
 Shearing machine, Two standard electric  
 plate ..... 229, 230  
 Shearing and coiling machine, Circular. 194  
 Sheet bar skid ..... 287  
 Sheet bar skid and high level lip ..... 290  
 Sheet bar skid, Single standard ..... 289

Sheet bar skid, Low level ..... 288  
 Sheet bar rolling mill ..... 91  
 Sheet bar stacking device ..... 296  
 Sheets, Doubling shears for ..... 257  
 Sheets in cases, Magnet for transporting 258  
 Sheets, Pickling plant for ..... 259, 261  
 Shifting device, Billet ..... 72  
 Single standard sheet bar conveyor .... 289  
 Skids ..... 113-117  
 Skids, Sheet bar ..... 287-290  
 Skids, Universal iron shearing machine  
 with ..... 294-295  
 Slab and bloom charging crane .. 266-269  
 Slab charger ..... 266, 267  
 Slab crane for the reheating furnace ... 265  
 Slab mill, Spindle housings for ..... 213  
 Slabs, Magnet crane for transporting 210, 264  
 Slabs, Tongs for heavy ..... 208, 210  
 Sleeper shearing machine, Electric ..... 114  
 Small section double two-high mill .... 162  
 Small section mill with continuous roug-  
 hing mill ..... 159  
 Smithy, Chain ..... 355  
 Smoothing and curving machine for cor-  
 rugated iron ..... 224  
 Soaking pit crane ..... 3-5, 265  
 Soaking pit crane with cover-lifter ..... 343  
 Soaking pit crane with magnetic cover-  
 lifter ..... 5  
 Spindle brackets ..... 97  
 Spindle housings connected to main coupl. 21  
 Spindle housings, Double two-high 164, 165  
 Spindle housings for slab mill ..... 213  
 Spindle housings for small section mill 155  
 Spindle housings for thin section rolling  
 mill ..... 154  
 Spindle housings for three-high mill 272, 276  
 Spindle housings opened ..... 191  
 Spindle housings, Pinions for three-high 160  
 Spindle housings, Three-high ..... 32  
 Spindle housings, Two-high ..... 22, 91  
 Spur wheel roller gear, Electric ..... 30  
 Spur wheels ..... 365



# INDEX

Starting gear, Electric ..... 56, 57  
 Starting gear, Old-fashioned ..... 57  
 Steam hammer for fore-forging tyres and discs ..... 336  
 Steam hydraulic flanging press ..... 246  
 Steam hydraulic shearing machine ... 66, 67  
 Straightening and bending machine, Combined ..... 238  
 Straightening and bending machine for tubes ..... 327  
 Straightening bank with lifting block 286-291  
 Straightening machine for metal bands 192, 193  
 Straightening machine for round iron .. 181  
 Straightening machine, Plate.. 231, 232, 257  
 Straightening press for sections ..... 121  
 Stretching bed for medium and small sections ..... 179  
 Stripping crane ..... 3  
 Swing shearing machine ..... 172  
 Table, Lever punching machine with.... 241  
 Table, System Demag, Automatic oscillating ..... 278  
 Three-high bar mill ..... 90, 97, 153  
 Three-high cogging mill ..... 150  
 Three-high housings for plates ..... 219  
 Three-high mill for copper rails and bars 155  
 Three-high mill for sections and round iron ..... 87-89  
 Three-high mill, Spindle housings for 272, 276  
 Three-high mill with stationary power lever ..... 92  
 Three-high mill with travelling power lever ..... 93  
 Three-high plate mill ..... 218, 219  
 Three-high small section mill of 7 housings ..... 157  
 Three-high spindle housings ..... 32  
 Three plunger press, Horizontal ..... 66  
 Three plunger pressure pump ..... 67  
 Tipping chair ..... 211  
 Tipping carriage, Electric travelling ..... 17  
 Tipping device, Bloom trolley with station. 16  
 Tongs for heavy slabs ..... 208-210

Tool steel, Double two-high mill for ... 163  
 Toothed wheels, Manufacture of... 361-366  
 Top roll, Attachment of ..... 28  
 Transmission roller gear ..... 113-120  
 Travelling crane conveying cogging rolls 101  
 Travelling crane in the machine works ..... 356-359  
 Travelling crane with slewing jib for transporting ingots ..... 10  
 Travelling ingot tipper ..... 16  
 Travelling roller gears and lifting tables ..... 105-111  
 Trolley, Bloom ..... 16, 266, 267  
 Tube conveyor ..... 324  
 Tube drawing bench ..... 323  
 Tube finishing shop ..... 325  
 Tube pusher and filter, Pneumatic ..... 316  
 Tube remover ..... 324  
 Tube rolling mill, Continuous 301, 306-309  
 Tube rolling mill, Pilgrim ..... 310-313  
 Tube rolling mill, The ..... 299-334  
 Tube straightening and bending machine 327  
 Tube straightening machine ..... 321, 324  
 Twin pusher for slabs ..... 209  
 Two-high billet mill ..... 20  
 Two-high blooming and pinion housings 32  
 Two-high blooming mill ..... 23-25  
 Two-high blooming mill, Electric .... 21-23  
 Two-high copper sheet mill housings .. 222  
 Two-high plate rolling mill ..... 220  
 Two-high reversing blooming mill ..... 19  
 Two-high reversing mill for plates 212, 217  
 Two-high sheet mill housings ..... 217, 220  
 Two-high spindle housings ..... 22, 91  
 Tyre mill ..... 335-348  
 Tyre soaking pit crane ..... 343  
 Underground wire coil ..... 205  
 Universal housings, Spur wheels for 364, 365  
 Universal hous., Three-high 271, 273, 280, 281  
 Universal iron, Hot bank for ..... 292, 293  
 Universal iron, Loading crane for ..... 297  
 Universal iron shearing machine with skid ..... 294, 295



# INDEX

Universal mill, Three-high ..... 272-279  
 Universal rolling mill ..... 263-284  
 Universal rolling mill, Finishing process  
     in the ..... 285-298  
 Universal rolling mill, Old-fashioned ... 270  
 Upsetting press, Hydraulic mandrel .... 329  
 Upsetting press, Hydraulic tube..... 330  
 Vertical hydraulic plate bending press . 251  
 Water cooling, Cold rolling mill with.. 194  
 Water gas, Tubes lap welded by ..... 319  
 Weight accumulator..... 67  
 Welded tube rolling mill ..... 318  
 Wheel and axle press, Hydraulic ..... 347

Wheels, Finishing sets of ..... 347  
 Winding machine for wire scrap ..... 205  
 Wire coil ..... 203-205  
 Wire coil, Edenborn ..... 205  
 Wire coil, Underground ..... 205  
 Wire coil with pointing machine,  
     Double ..... 179  
 Wire mill ..... 197-205  
 Wire mill, Copper ..... 202  
 Wire mill with automatic guide ..... 201  
 Wire mill with rope drive ..... 200  
 Wire rod mill ..... 154-159  
 Worm gear ..... 364

## DE MAG





**A**s its name implies, the object of the blooming mill is to reduce to square or rectangular cross-sections the pig bloom coming from the steel works, so as to prepare it for the later processes. After passing through the various grooves of the blooming mill several times, the bloom, which has then been considerably reduced in cross-section and consequently greatly elongated, is cut into several parts and these are taken to the mill trains to be further worked. In all instances in which it is necessary to reduce the rolled piece from the blooming mill still further, so that it can afterwards be worked in the small and medium iron mill trains, the rolled bloom passes from the blooming mill into a cogging mill geared up to the medium or small iron mill, and there it is drawn out into so-called billets, mostly of square cross-section. On leaving the blooming mill the rolled piece has to be tilted as may be required, and transferred from one groove to another. In the old fashioned blooming mills this had to be done by the workmen by hand, which meant the loss of a good deal of time and had a very deteriorating effect on the output of the rolling mill. On the other hand owing to this slow manual process of tilting and shifting, the iron that was to be rolled was greatly cooled, thus requiring more power in the rolling mill, besides which it caused much wear and tear of the rolls and a far greater strain on the various parts of the mill. In modern blooming mills all the movements necessary during the rolling process are effected by hydraulic or electric contrivances, the control gear being suitably erected on a raised service platform immediately alongside the housings of the rolling mill. From this platform it is easy for the attendant to watch and regulate the whole of the rolling process. The number of hands required in the whole of the rolling mill is thus considerably diminished, accidents, which were formerly of frequent occurrence due to the greater danger when the work was done by hand, are avoided, in addition to which the output of the rolling mill can be increased to a maximum, the cost of production being at the same time considerably decreased.



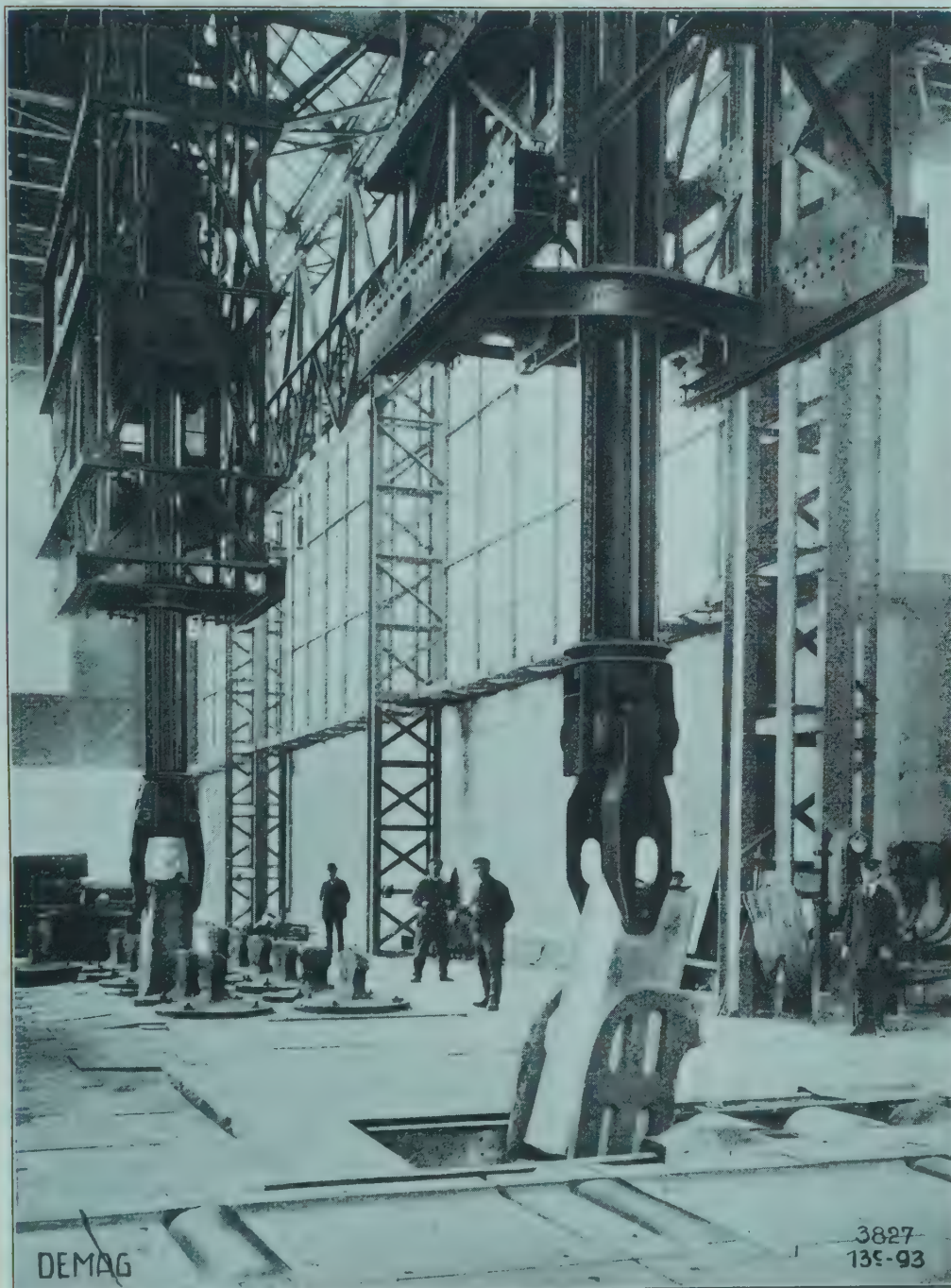
# FROM THE SOAKING PIT ROOM TO THE ROLLING MILL

---

**I**n the last part of our publication entitled „The Steel Works“ the making of the blooms from the molten metal and their conveyance to the rolling shop are described in detail, so that we need only give a brief summary here of the treatment of the blooms in the soaking pit room and to illustrate a few of the cranes and machines required for transporting the blooms from the soaking pit to the rolling shops. When the mould has been removed from the pig bloom the latter is taken up by the stripping crane or by a special soaking pit crane and deposited in the soaking pit, where it is uniformly heated till it is warm enough to be rolled. The soaking pits are either heated merely by the heat of the blooms deposited in them or they are fitted with their own heating apparatus which, in recent times, has been heated by purified blast furnace gas. Each pit is closed by means of a cover of iron construction or of cast steel, which, like the pit itself, is lined with refractory material. Of late the covers have been so constructed as to be capable of being raised by the tongs of the soaking pit crane, this requiring only a suitable construction of the upper part of the cover (Dahl's patent). But often the crane is fitted with a special cover lifting device which works quite independently of the ingot tongs of the crane. Trolleys that travel along the floor, driven by electricity or by hand, are also used for raising the covers. When the bloom in the soaking pit has reached the uniform heat needed for the rolling process the electric ingot crane draws it out of the pit and takes it, hanging vertically, to a weighing machine where its weight is tested, and from there to the electric or hydraulic bloom filter. The filter deposits the bloom slowly on the live roller gear of the blooming mill without causing any impact, and the roller gear conveys it to the actual housings of the rolling mill.



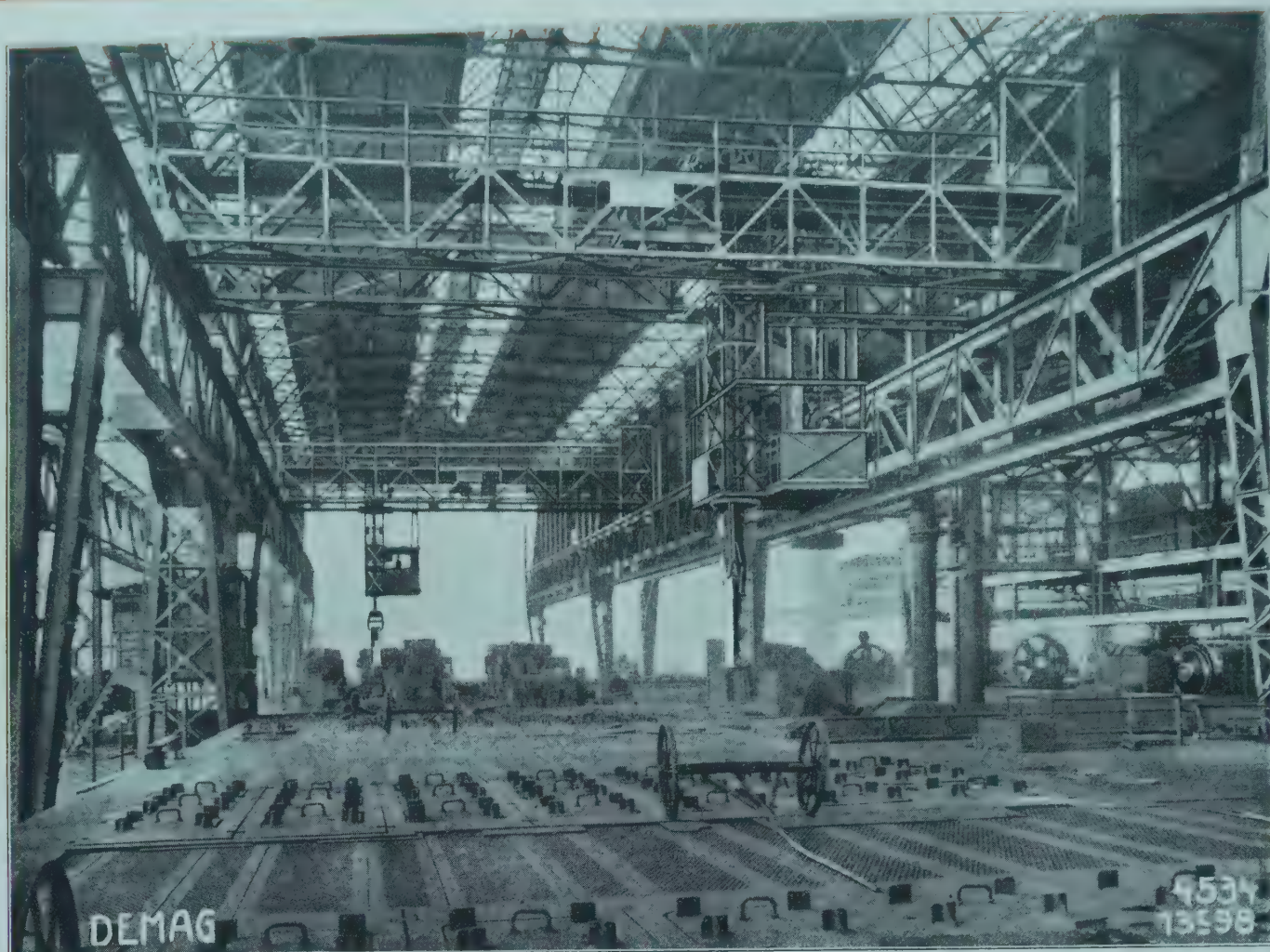
**T**he slender form of the tongs of our soaking pit cranes, which is adapted to the opening in the soaking pits, enables the space in the pit to be well utilised. After being withdrawn the blooms



TWO STRIPPING AND SOAKING PIT CRANES / DELIVERED TO THE VEREINIGTEN HÜTTENWERKE BURBACH-EICH-DÜDELINGEN, ESCH WORKS, ESCH ON ALZETTE

are deposited by the same cranes on the tilting carriage, which lays them on the live roller gear of the rolling mill, that has also been delivered by us. A skilful crane attendant gives the bloom the right slope for the tilting carriage by grasping it sideways.





TWO SOAKING PIT CRANES TO CARRY 5000 KIL., SPAN 20 MET.  
DELIVERED FOR THE PEINE ROLLING MILL CO., LTD., PEINE

**T**he tongs of these cranes, which are attached to a rotating and rigidly guided pillar, serve not only for inserting and withdrawing the blooms, but also for raising and lowering the cover of the soaking pit, which has been arranged specially for this purpose according to Dahl's patent. One peculiarity in the construction is the control of the tongs, which enables them to be easily opened and closed by means of a pedal in the driver's cage, for which, contrary to the types hitherto in vogue, very light counterweights are necessary.





TWO SOAKING PIT CRANES, LIFTING CAPACITY 5000 KILOS. SPAN 18 METRES / DELIVERED FOR THE GELSENKIRCHENER BERGWERKS-AKTIEN-GESELLSCHAFT, DEPARTMENT AACHE-  
NER HÜTTEN-VEREIN, ADOLF-EMIL-HÜTTE, ESCH ON ALZETTE



ON THE LEFT  
SOAKING PIT  
CRANE

with magnetic cover  
lifting contrivance for  
the soaking pits

ON THE RIGHT  
MONORAIL  
CRAB

for conveying the  
blooms from the  
foundry to the  
soaking pits in the  
rolling mill





# MACHINES AND CRANES FOR SERVING THE REHEATING FURNACES

---

**W**hereas the rolling mills connected with a basic steel works can often manage with unheated soaking pits for the heating of the blooms that are delivered from the steel works at comparatively uniform and short intervals, those rolling mills receiving their raw material from an open hearth steel works must be fitted with heated soaking pits or with reheating furnaces situated above the ground, because in the latter works large quantities of pig blooms are produced at one time, at intervals of 3 or 4 hours. The blooms therefore require to be accumulated, and to be raised to the rolling temperature by being passed through reheating furnaces. The choice of the transporting contrivances for conveying the blooms into and out of the furnaces depends chiefly on the situation of the reheating furnaces with respect to the steel works on the one hand, and to the rolling mill on the other. Thus it may happen that in one case it is advisable to have a stationary charging device or one with transverse motion, in the other case an ingot charging crane or car. The withdrawal of the blooms can be effected most conveniently with the aid of an ingot charging crane or car, which is also the simplest means of laying the blooms on the live roller gear, by which they are conveyed to the mill train. As regards the kind of drive, the cars which were formerly built for serving the reheating furnaces, and generally driven by steam, which are still to be found in use now and then, may be said to be out of fashion. Hydraulic drive has still held its ground for stationary charging contrivances, but even these are now, for the most part, driven by electricity, as is the case with the majority of the machines in use now-a-days.

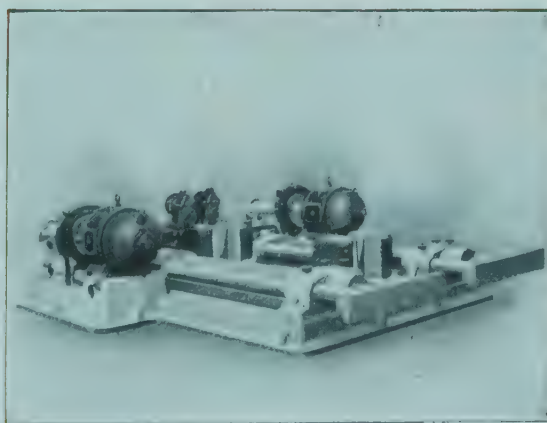




INGOT CRANES FOR SERVING THE REHEATING FURNACE OF THE VEREIN. STAHLWERKE V. D. ZYPEN U. WISSENER EISENHÜTTEN-A.-G., COLOGNE-D.

**T**he crane seen in the foreground, the tongs of which allow of blooms of various lengths being gripped by the fronts, deposits the blooms before the stripper plunger of the electric charging machine, whilst the travelling crane in the adjacent room draws the heated blooms out of the furnace by the side doors and lays them on the roller gear.

Electric bloom charging machine with two independent stripper plungers worked by spindles, for double reheating furnaces



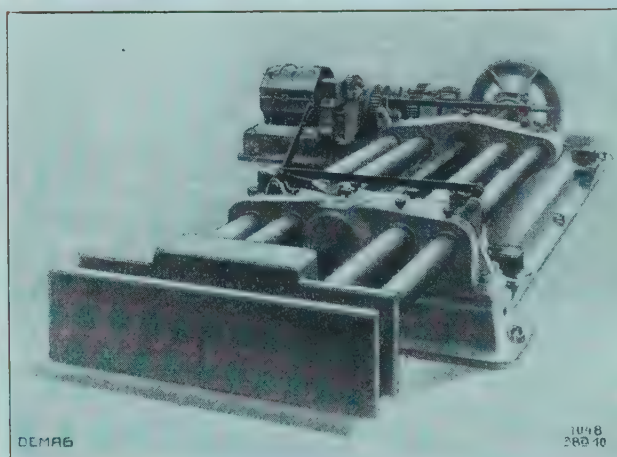
Delivered to  
„PHÖNIX“  
Aktien-Gesellschaft für  
Bergbau und Hütten-  
betrieb,  
Duisburg-Ruhrort





BLOOM CHARGING MACHINE / DELIVERED TO THE VEREINIGTEN HÜTTEN-  
WERKE BURBACH-EICH-DÜDELINGEN, DÜDELINGEN (LUXEMBOURG)

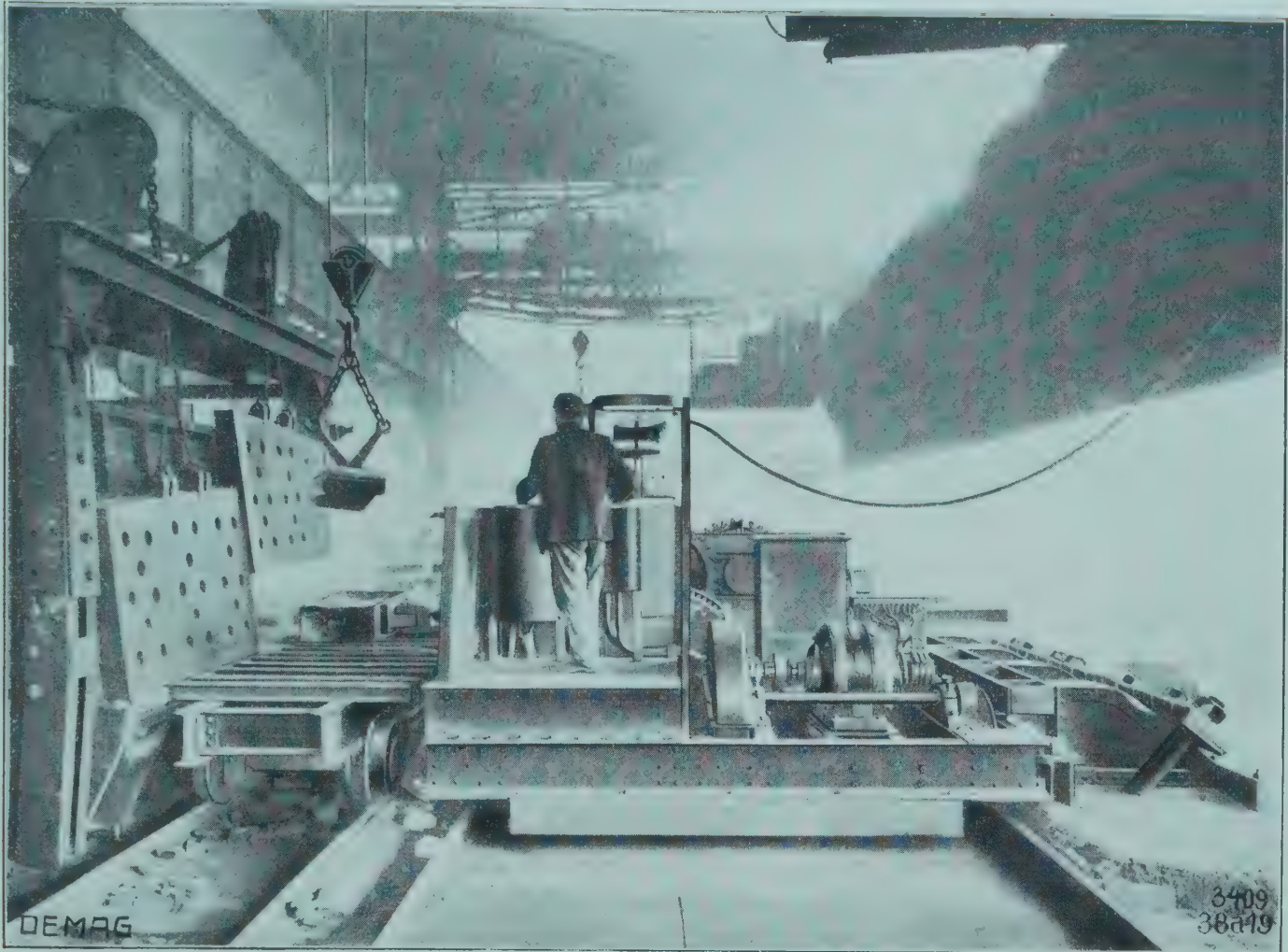
Five electric  
charging machines  
of this description  
were delivered to



The Verein. Hütten-  
werke Burbach-Eich-  
Düdelingen,  
Dept. Düdelingen

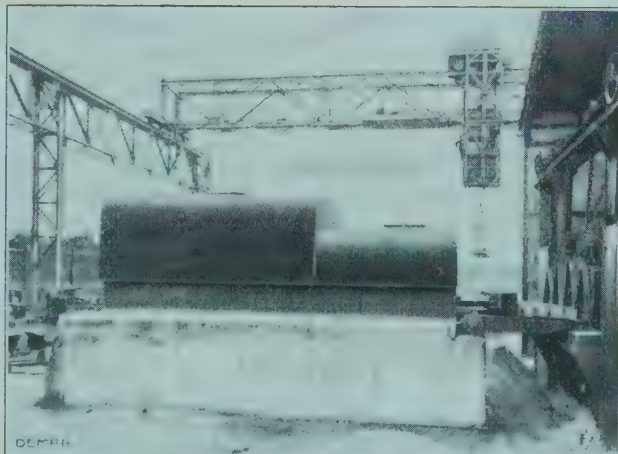
**T**he special advantage of stationary charging machines of the description shown above lies in the 6 metre stroke, which is a very long one compared with the short construction of the machine, and which is produced by the back headplate being withdrawn after the first stroke of 3 metres and being again coupled up to the drive at a distance of 3 metres from the front headplate, which had remained stationary. The feed stroke has a strength of 60 tons.





CHARGING MACHINE / DELIVERED FOR THE COMPAGNIE DES FORGES ET ACIÉRIES DE LA MARINE ET D'HOMÉCOURT, MEURTHE ET MOSELLE

Gelsenkirchener  
Bergwerks-Aktien-  
Gesellschaft,  
Dept. Aachener



Hütten-Verein,  
Tin-plate and Thin  
Sheet Rolling Mills,  
Hüsten in Westphalia

**T**he bloom charging machines are made traversing or stationary according to special local requirements. They are driven by hydraulic power, or of late more generally by electricity. The upper illustration shows a travelling machine. The powerful pressures needed for feeding the blooms necessitate a strong abutment against which the carriage can press itself. The lower illustration shows a machine which works in the open air and is therefore completely encased.

The blooms are brought to this machine by one of our magnet cranes.





OVERHEAD TRAVELLING CRANE WITH SLEWING JIB FOR TRANSPORTING BLOOMS / DELIVER. TO THE GUSSTAHLWERK WITTEN, A.-G., WITTEN-RUHR



The arrangement of the modern open hearth works, in which the material is transported as straight across the hall as possible, has given rise to a number of special types of cranes. The jib crane illustrated on this page fetches the blooms from the foundry through the doors, depositing them in the ingot stores or laying them down just in front of the charging contrivance of the reheating furnace. Three of these charging machines, also delivered by us, are erected side by side and fitted with hydraulic forward feed.

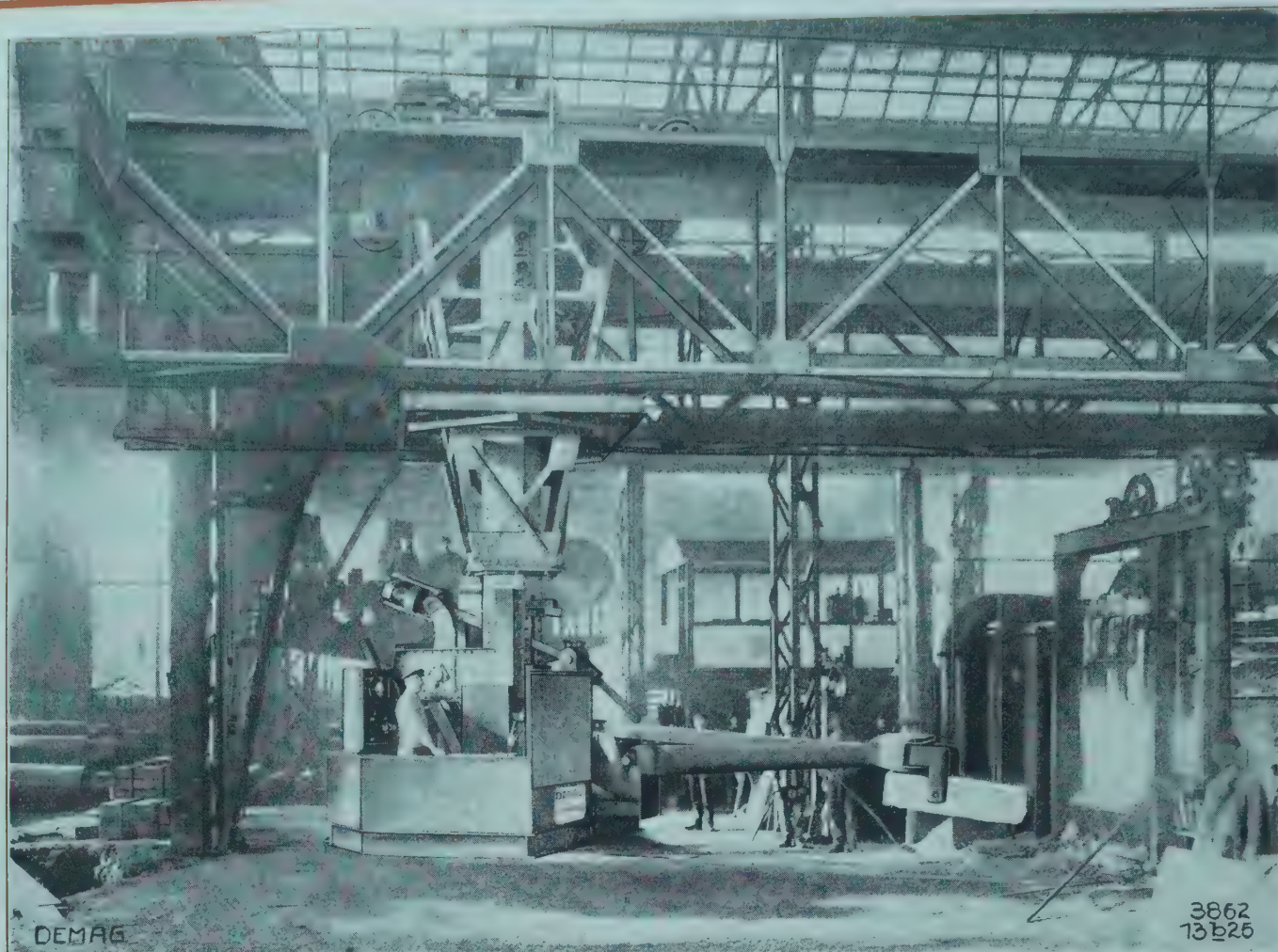




BLOOM TRANSPORT. CRANE WITH LIFTING MAGNET / DELIVERED TO THE BOCHUMER VEREIN FÜR BERGBAU U. GUSSTAHLFABRIKATION, BOCHUM

**I**n place of the ingot tongs it is very often advantageous to employ lifting magnets for lifting pig blooms from the trolleys or from the piles of blooms, and for depositing them on the guide plates of the charging machines. The crane shown in the illustration can carry at one time as many as 3000 kilos of ingots with its magnet, which is fitted with movable poles. To enable it to lay down the ingots in one constant direction the magnet is made to rotate about its axis, which is capable of being raised and lowered. It can also transport fairly warm blooms with safety.

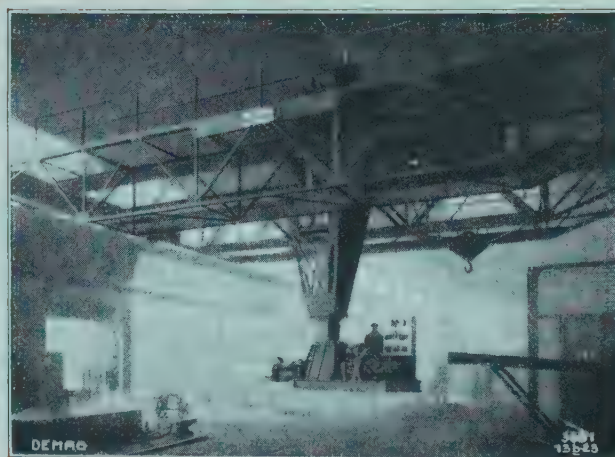




BLOOM CHARGING CRAB TO CARRY 3000 KIL., GAUGE OF TRACK 2.90 MET. DELIVERED TO THE HASPER EISEN- U. STAHLWERK, A.-G., HASPE IN WESTPH.

### ELECTRIC BLOOM CHARGING CRANE

To carry 5000 kilos  
::: Span 17 metres :::

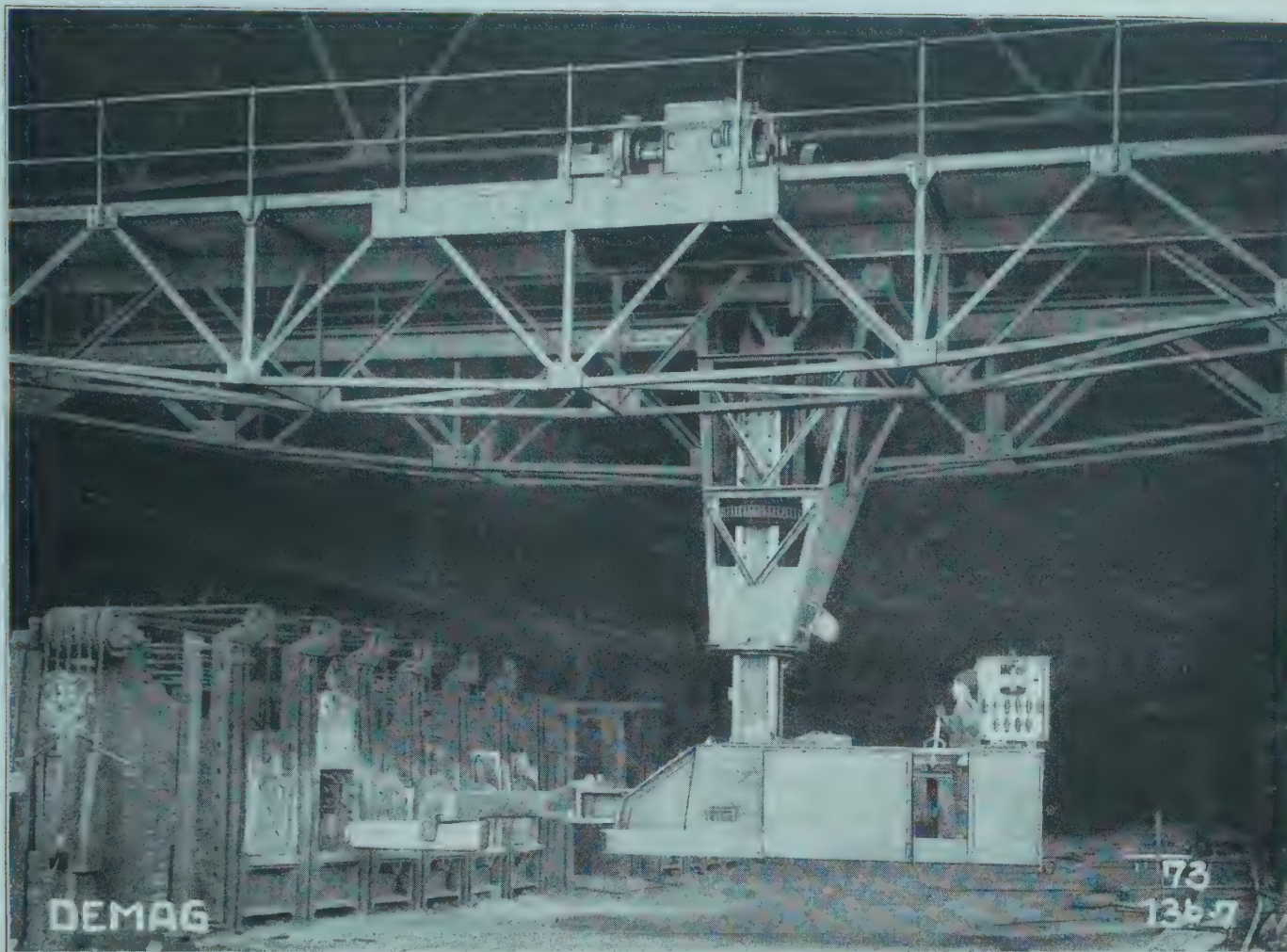


### METALLURGICAL WORKS KRAMATORSKAJA

KRAMATORSKAJA  
GOVT. CHARKOW

Very often the erection of an ingot drawing crab on a fixed track, as shown above, suffices, when the roller gear lies alongside the reheating furnace in such a way as to be able to withdraw and deposit the bloom simply by crab travel and the slewing of the charging lever. The gripping of the bloom and the raising of the charging lever are effected by the same motor, in such a manner that the lifting movement is started automatically as soon as the tongs are completely closed. The lower illustration shows a crane with so-called crocodile tongs.





BLOCK CHARGING CRANE TO CARRY 1000 KILOS, SPAN 17.4 METRES  
DELIVERED TO BALDWINS LIMITED, LANDORE (SOUTH WALES)

### ELECTRIC BLOCK CHARGING CRANE

To carry 2000 kilos  
::: Span 20 metres :::



### BOCHUMER VEREIN FÜR BERGBAU UND

GUSSTAHLFABRI-  
KATION BOCHUM

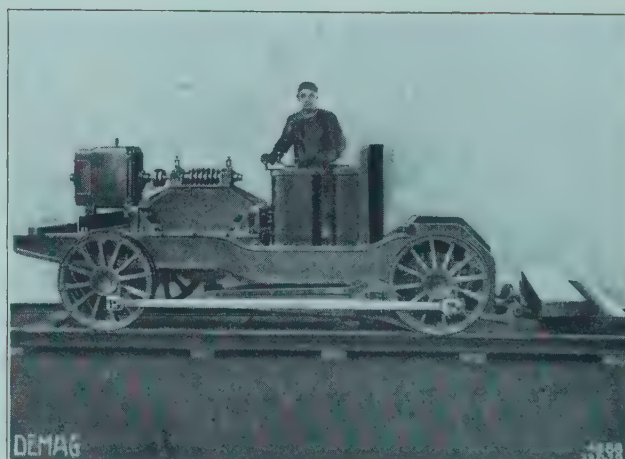
**I**f the blooms can conveniently be laid so that there is a little space between them, tongs which grip the blooms sideways are to be recommended, as they do not need to go so far into the fire and can be more easily watched by the crane attendant. They therefore work comparatively more rapidly and are exposed to the heat for a shorter space of time. Moreover, the tong arms, spares of which should be kept in stock, are only small. The blooms are gripped behind their centre of gravity and lie with the back portion underneath the cast steel charging lever.



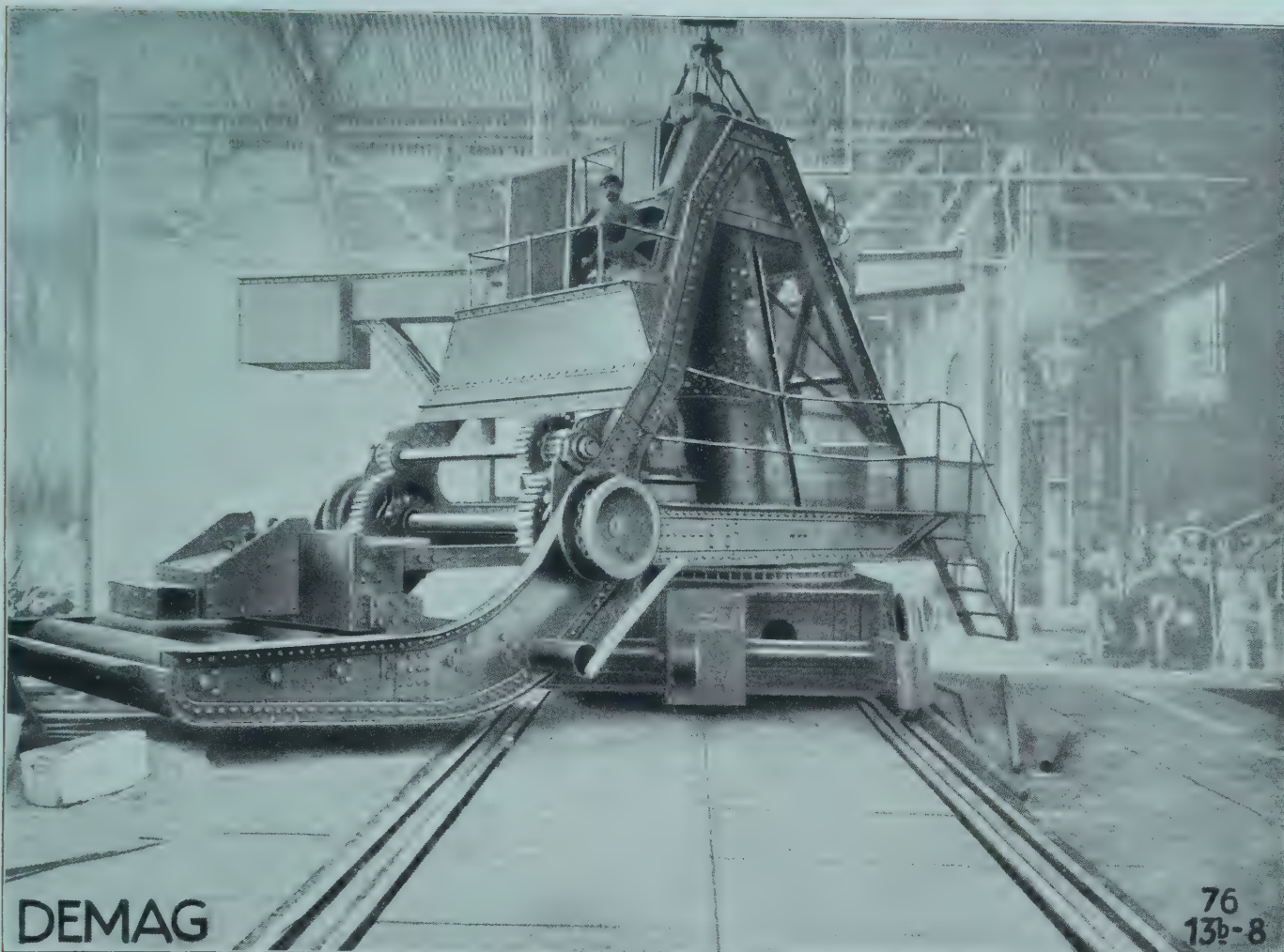


INGOT CHARGING CARRIAGE / DELIVERED FOR THE VEREINIGT. HÜTTENWERKE BURBACH-EICH-DÜDELINGEN, DEPT. BURBACH

According to local circumstances machines constructed in the form of a carriage are employed for withdrawing the ingots or for transporting them to the roller gear, and these are fitted with ingot tongs as shown in the above illustration, or take up the blooms on conveying claws, pushing them from these claws on to the roller gear by means of special contrivances.

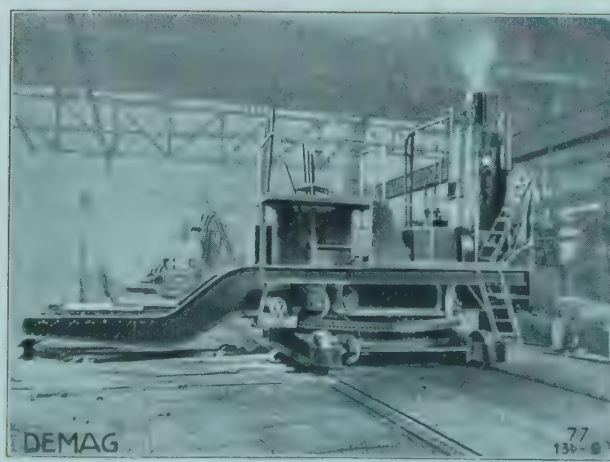
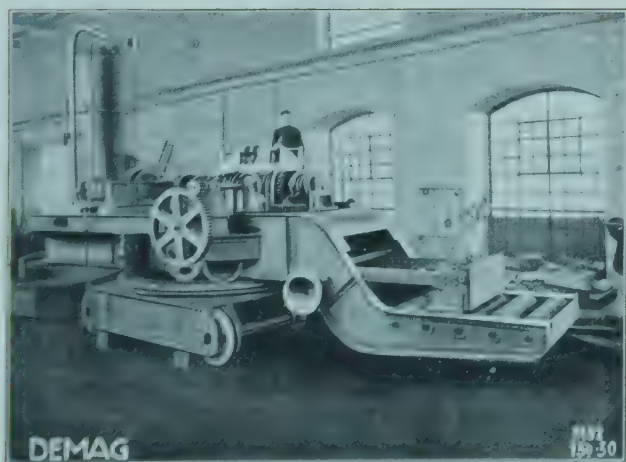






## INGOT CHARGING CARRIAGE TO CARRY 20,000 KILOS DELIVERED FOR THYSSEN & CO., MÜLHEIM-RUHR

**F**or ingots of specially large dimensions carriage-shaped machines which travel along the ground are sometimes employed, in which the ingots rest on rolls supported in a jib. They can easily be pushed off these rolls by mechanical guide plates. The jib rotates in a complete circle. The machine illustrated above is driven by electricity, whereas the two shown below are older machines with steam drive.







BLOOM TROLLEY WITH STATIONARY HYDRAULIC TIPPING CONTRIVANCE / DELIVERED TO THE IMPERIAL JAPANESE STEEL WORKS, YAWATAMACHI

Though the bloom heating furnaces are generally erected in close proximity to the rolling mill local circumstances sometimes necessitate the erection of the soaking pits at some distance from the rolling mill. In such cases it may be advisable to have a travelling tipping contrivance instead of the stationary one situated immediately in front of the roller gear. In the present instance the actual tipping device, which is worked by a hydraulic piston was erected in front of the roller gear, whereas the tipping carriage is run by electricity and couples itself to the tipping device automatically on arriving at the roller gear. The car is controlled from a stationary driver's stand.





## ELECTRIC TRAVELLING TUMBLER / DELIVERED TO THE GELSENKIRCHENER BERGWERKS-AKTIEN-GESELLSCHAFT DEPARTEMENT AACHENER HÜTTEN-VEREIN, AACHEN-ROTE-ERDE

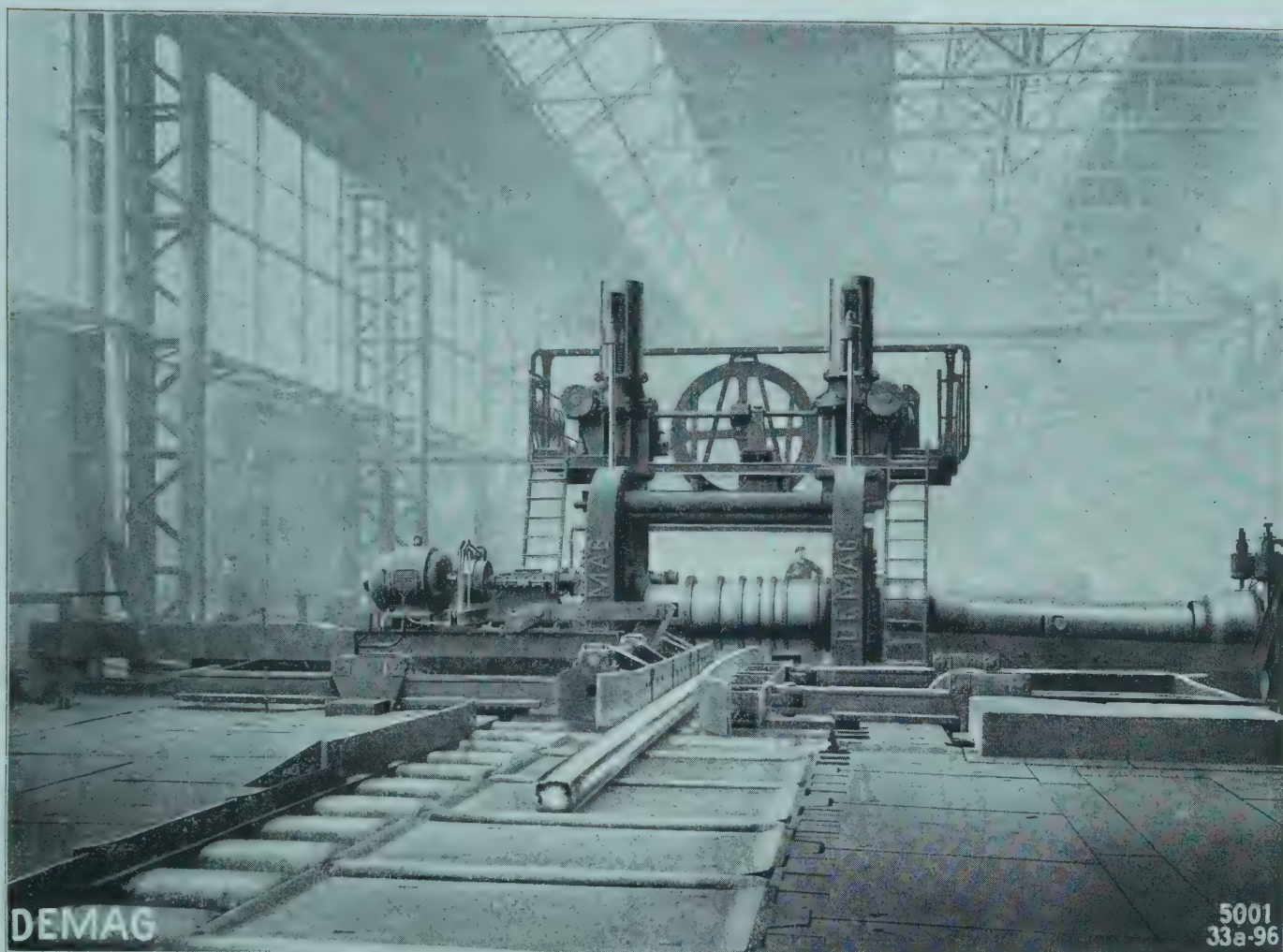
**I**n this plant the soaking pits are about 90 metres distant from the bloom roller gear. The tumbler can take slabs up to 30,000 kilos in weight, which are conveyed to a plate reversing rolling mill also delivered by us. The travelling motion is controlled from the driver's stand, which is arranged on the tumbler, whereas the tipping just in front of the bloom roller gear at the end of the track is effected automatically by the guide roll of the lever seen in the illustration striking against a stop fixed alongside the track. On returning the tumbler returns automatically to its upright position, so that it is at once ready to take up a fresh bloom.



# THE BLOOMING MILL

As already mentioned at the outset, blooming mills are used for rolling to the required cross-section the pig blooms coming from the steel works. The blooming mills for the biggest cross-sections and for the largest outputs are all designed as reversing rolling mills. In the old types the top roll was adjusted by hydraulic power and balanced either by hydraulic power or by suitable counterweights. The manipulators were also worked by hydraulic power. In consideration of the drawbacks connected with hydraulic power, and in order to introduce a uniform type of drive, efforts have been made during the last few years to apply electricity as the sole motive power. We have been specially fortunate in our solution of the electric adjustment and balancing of the top roller by connecting the counterweight with the electric adjusting gear, according to the Demag Patent. Quite apart from the clear arrangement of the moving mechanisms on the housings themselves, another great advantage is that outside the housings and their bed plates there are no inaccessible mechanisms of difficult supervision. By connecting the balancing with the adjusting apparatus of the top roll the whole construction of the housings has been greatly simplified and a guarantee is given for the uniform and automatic sliding of the top roll. This arrangement allows the rise of the top roll to be made very great without any difficulty, and we have already delivered rolling mills with such adjustments in which the roll had a range up to 1000 mm. An indicator which can easily be seen from the attendant's platform is connected with the adjustment, so as to enable the attendant to adjust the roll without any difficulty. The connection of the roller stands, so as to take up the lateral pressures and avoid the slipping of one or other of the stands, was effected in the old-fashioned types by suitable distance bolts, either by wedging or with the help of spacing tubes. For many years past, however, in consideration of the constantly increasing claims on such a rolling mill, the stands have been propped against each other by heavy traverses, which thus guarantee absolute stability of the housings for the biggest passes and for the heaviest strain on them. This stability is assisted by making the feet of the stands of large dimensions and fixing them firmly to the base plates.

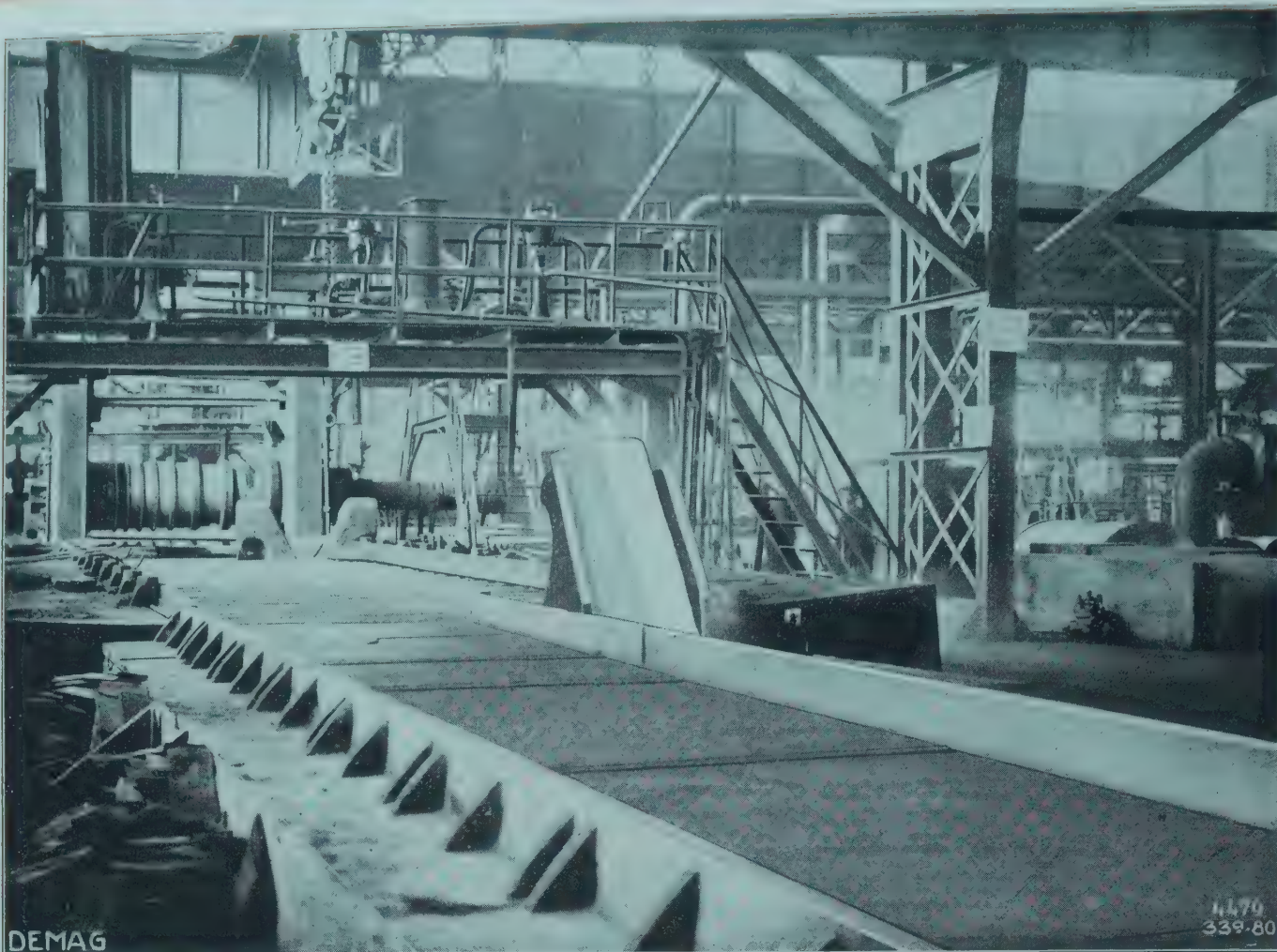




1150 mm. TWO HIGH REVERSING BLOOMING MILL / VER. HÜTTENWERKE  
BURBACH-EICH-DÜDELINGEN, AKT.-GES., WERK ESCH, ESCH A.D. ALZETTE

**T**his mill, on which blooms up to 5000 kilos in weight can be rolled, is driven by a reversible steam engine. The top roll is spring mounted on the Demag Patent system, and is raised and lowered by electromotors mounted on the housings. Before and behind the blooming mill there is an electric manipulator attached.

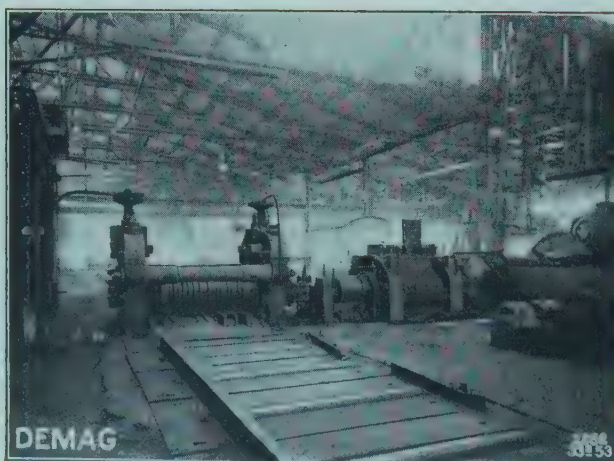




**BLOOMING MILL (1100 mm.) / DELIVERED FOR THE DEUTSCH-LUXEMBURGISCHE BERGWERKS- UND HÜTTEN-AKTIENGESELLSCHAFT, DEPARTEMENT DIFFERDINGEN, DIFFERDINGEN (LUXEMBURG)**

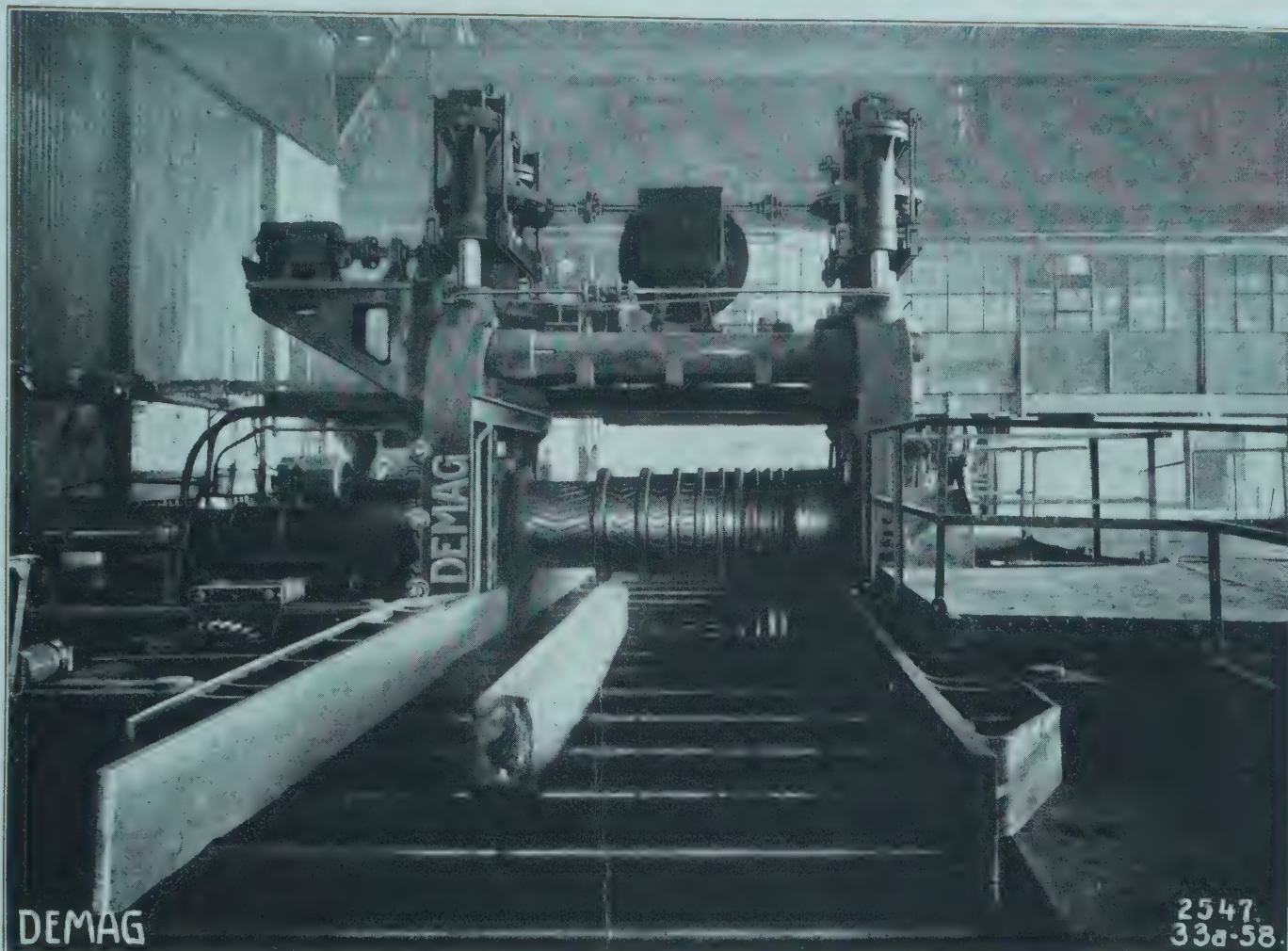
**I**n this blooming mill, with rolls of 2800 mm barrel-length, the roller gears, the upper rim of which is generally on the floor level of the metallurgical works, lie about 800 mm. above the floor level. This arrangement enables a better supervision of the roller gears and facilitates any repairs. The tilting and shifting of the ingots is simultaneously performed by two hydraulic manipulators with inclined surfaces.

**TWO HIGH  
BILLET MILL  
(850 mm.)**



**Delivered  
to a big Rhenish  
metallurgical works.**

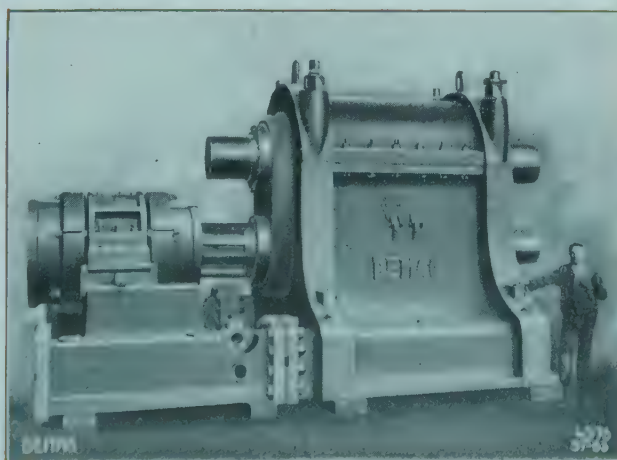




TWO HIGH BLOOMING MILL (1100 mm.) DRIVEN BY ELECTRICITY  
 OBERSCHLESISCHE EISENINDUSTRIE, AKT.-GES. FÜR BERGBAU UND  
 HÜTTENBETRIEB, DEPARTEMENT JULIENHÜTTE, BOBREK, UPPER SILESIA

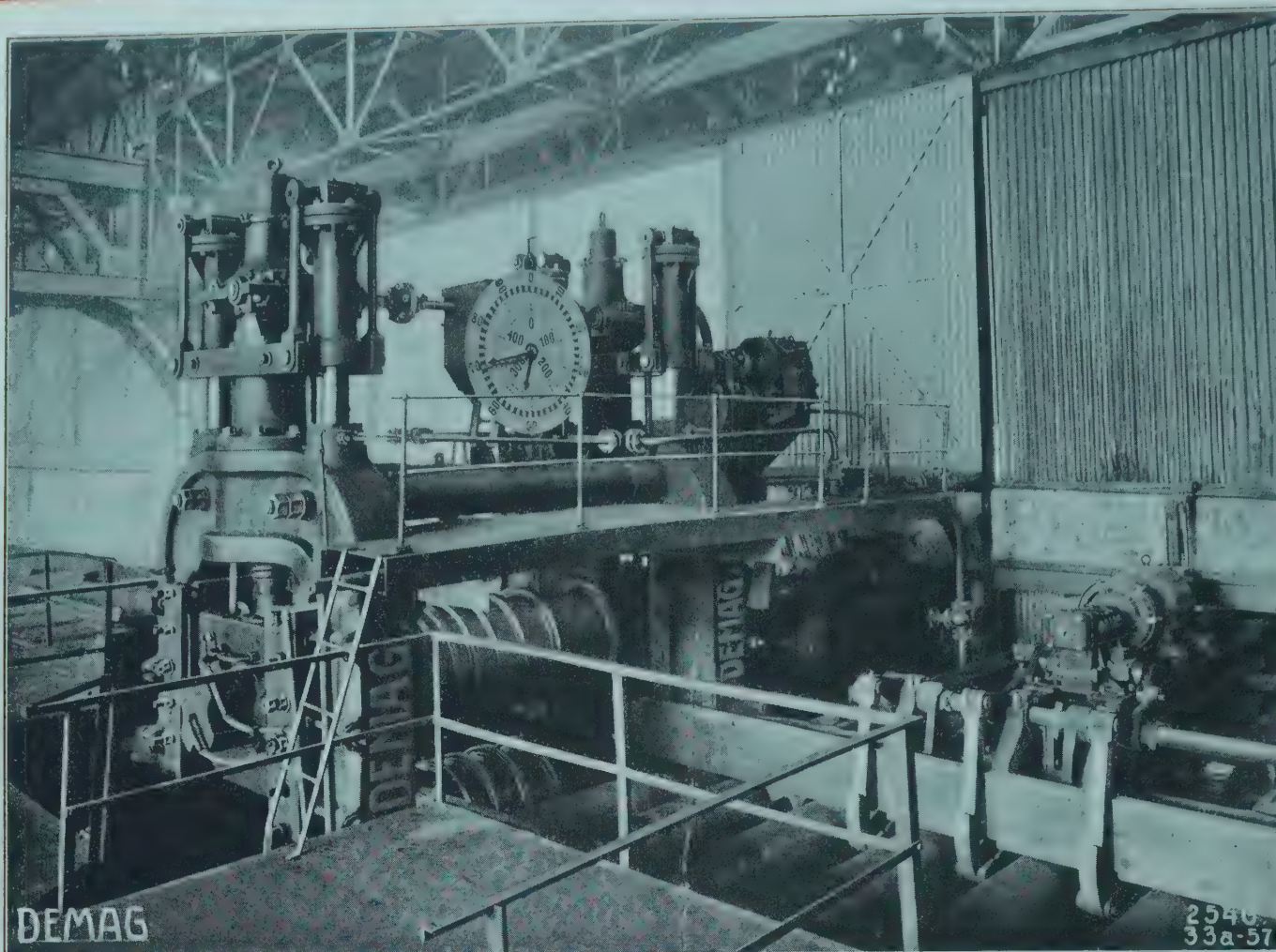
**T**he illustration shows the blooming mill from the exit side of the ingot, and gives a very good view of the long shifting guides which keep the ingot always exactly at rightangles to the rolls, enabling it to be conducted into the proper calibre both easily and quickly. The top roll is adjusted by electricity, its weight being counterbalanced by hydraulic pistons.

Spindle Housings  
 (1120 mm.)  
 connected to the  
 main coupling.



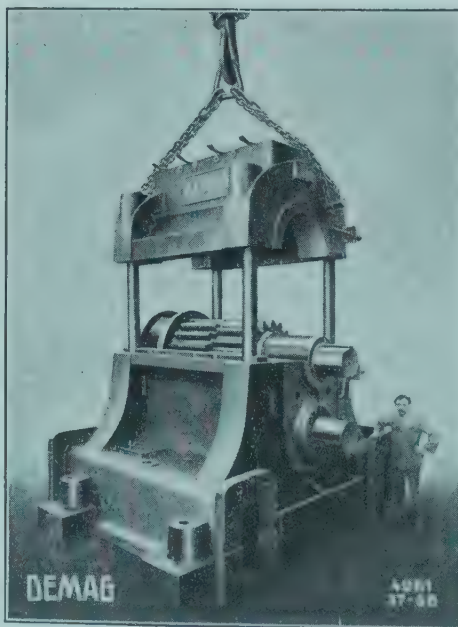
Delivered to  
 a big metallurgical  
 works in Rhenish  
 Westphalia.





**TWO HIGH BLOOMING MILL (1100 mm.) ELECTRICALLY DRIVEN  
OBERSCHLESISCHE EISENINDUSTRIE, JULIENHÜTTE, BOBREK, UPP. SILESIA**

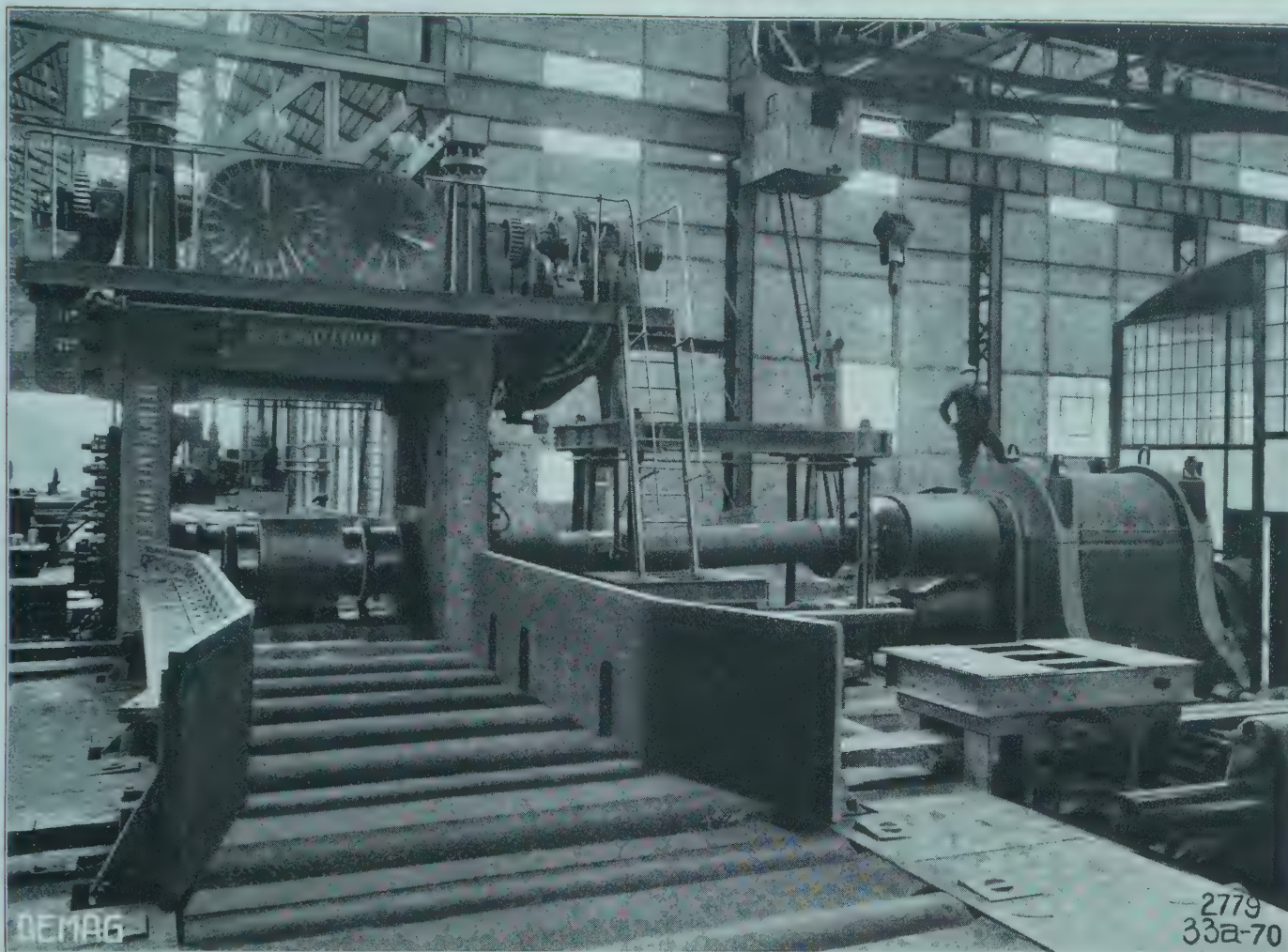
**T**he mill illustrated on the previous page is shown here from the inlet side. For tilting the ingot there are three tilting hooks which may be seen on the shifting guide, and which are moved by a special gearing built on the guide, that is run by an electro-motor. The whole driving mechanism for tilting is therefore easy of access and control, being situated above the floor.



**Two High Spindle Hou-  
sings (800 mm.) Delivered to  
the Rombacher Hüttenwerke,  
A.-G., Rombach i. Lothringen.**

The teeth of the pinions have double pitch and are displaced by half a pitch.



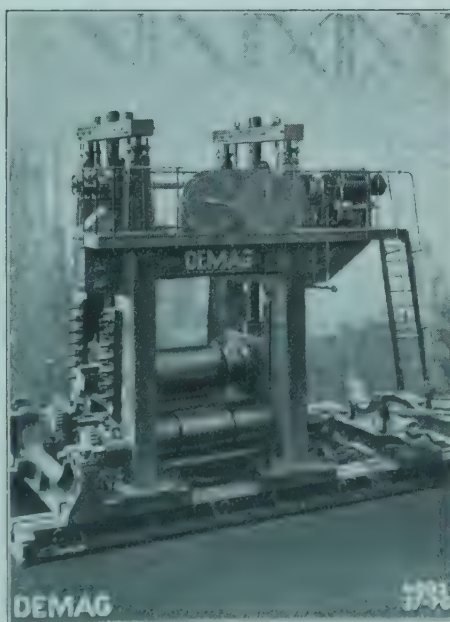


TWO HIGH BLOOMING MILL, ROLLS 915 mm. IN DIAMETER  
SKINNINGROVE IRON CO. LIMITED, CARLIN-HOW, R.S.O. YORKSHIRE

The rolling mill is driven by a 12,000 H.P. reversible rolling mill engine with Ilgner convertor. Three-phase motors drive the roller gears and adjust the ingot and bloom rolls. On the other hand the tilting devices, the slab shifting guides, the disconnecting of the main coupling, the counterbalan-

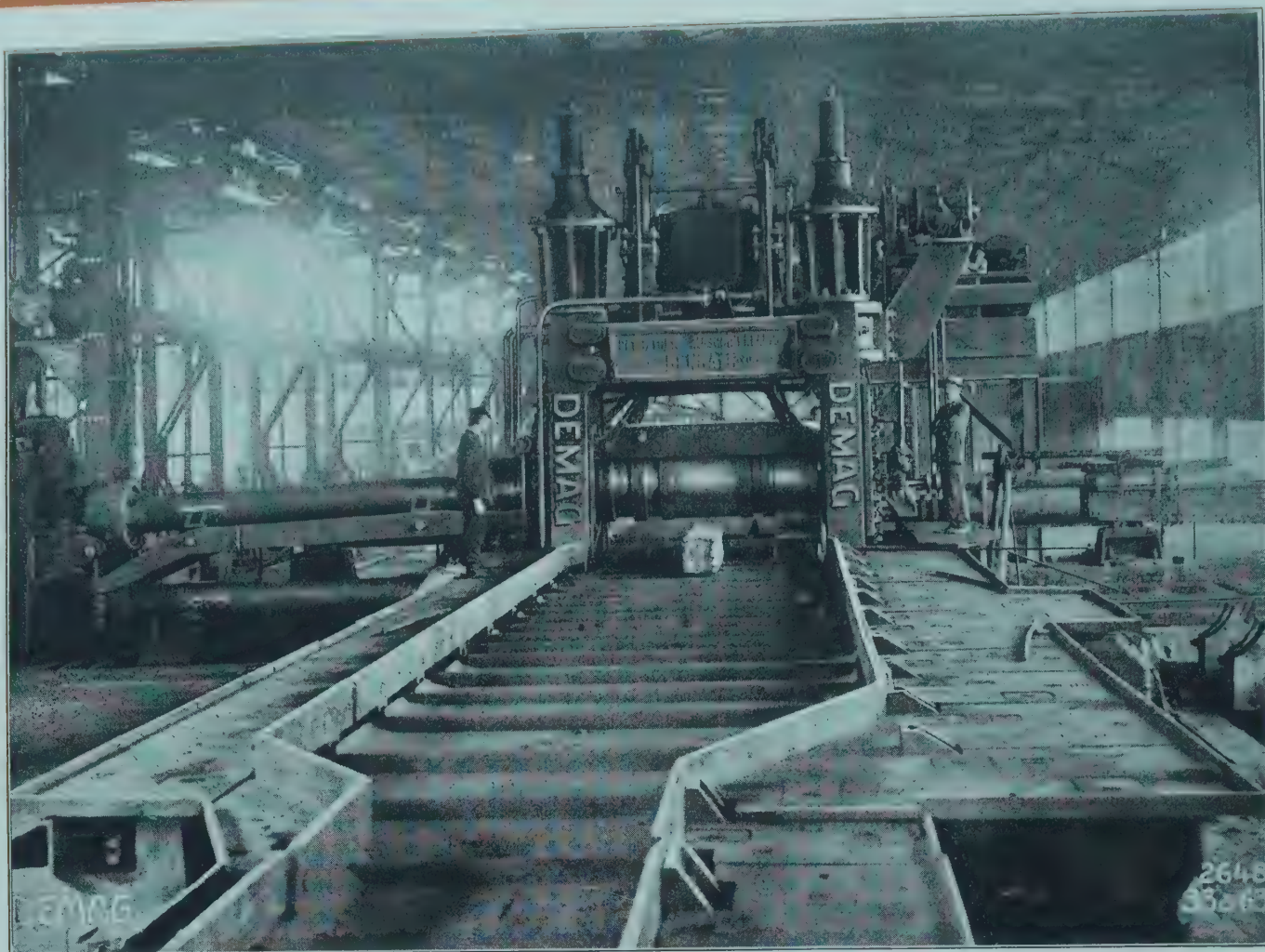
cing of the top roll etc. are effected by hydraulic power at the special request of the firm.

The accompanying illustration shows the above blooming mill in course of erection in our workshop.



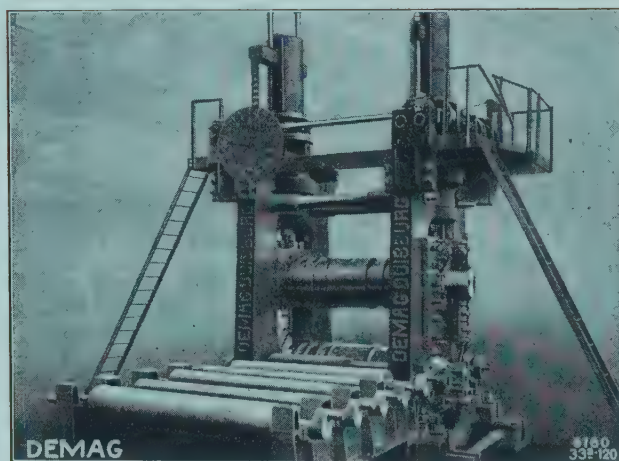
The stepped cones built into the housings are driven by spur wheel gear from roller gears.





REVERSIBLE BLOOMING MILL (900 mm.) / DELIVERED TO THE IMPERIAL JAPANESE STEEL WORKS, YAWATAMACHI

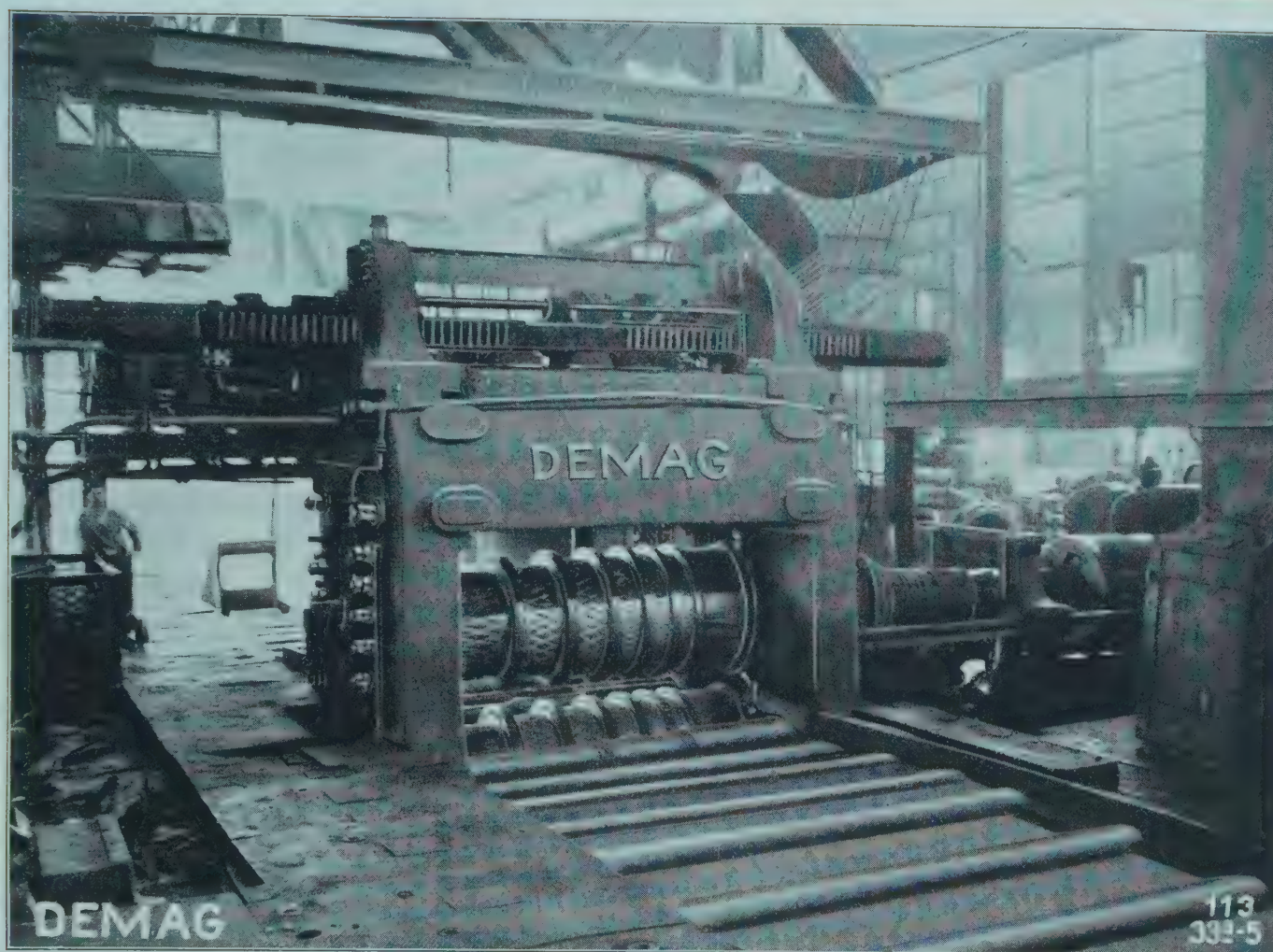
Housings with electric adjustment for the spring mounted top roll, Demag Patent.



The roller gears are driven by cranks and connecting rods, Demag Patent.

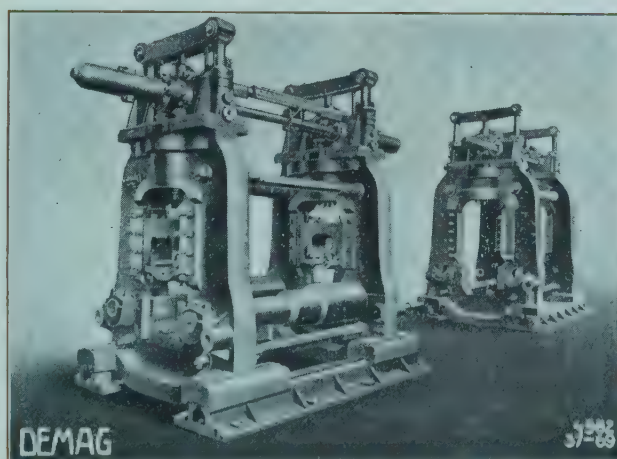
**T**he top roll, which is counterbalanced by hydraulic power, is raised and lowered by electricity. Manipulators, driven by hydraulic power and fitted with special slab erecting contrivances are arranged in front and at the back of the mill.





REVERSIBLE BLOOMING MILL (1150 mm.) „PHOENIX“, AKT.-GES. FÜR BERGBAU UND HÜTTENBETRIEB, DUISBURG-RUHRORT

Housings with hydraulic adjustment and counterbalancing of the top roll, with stepped cones built in

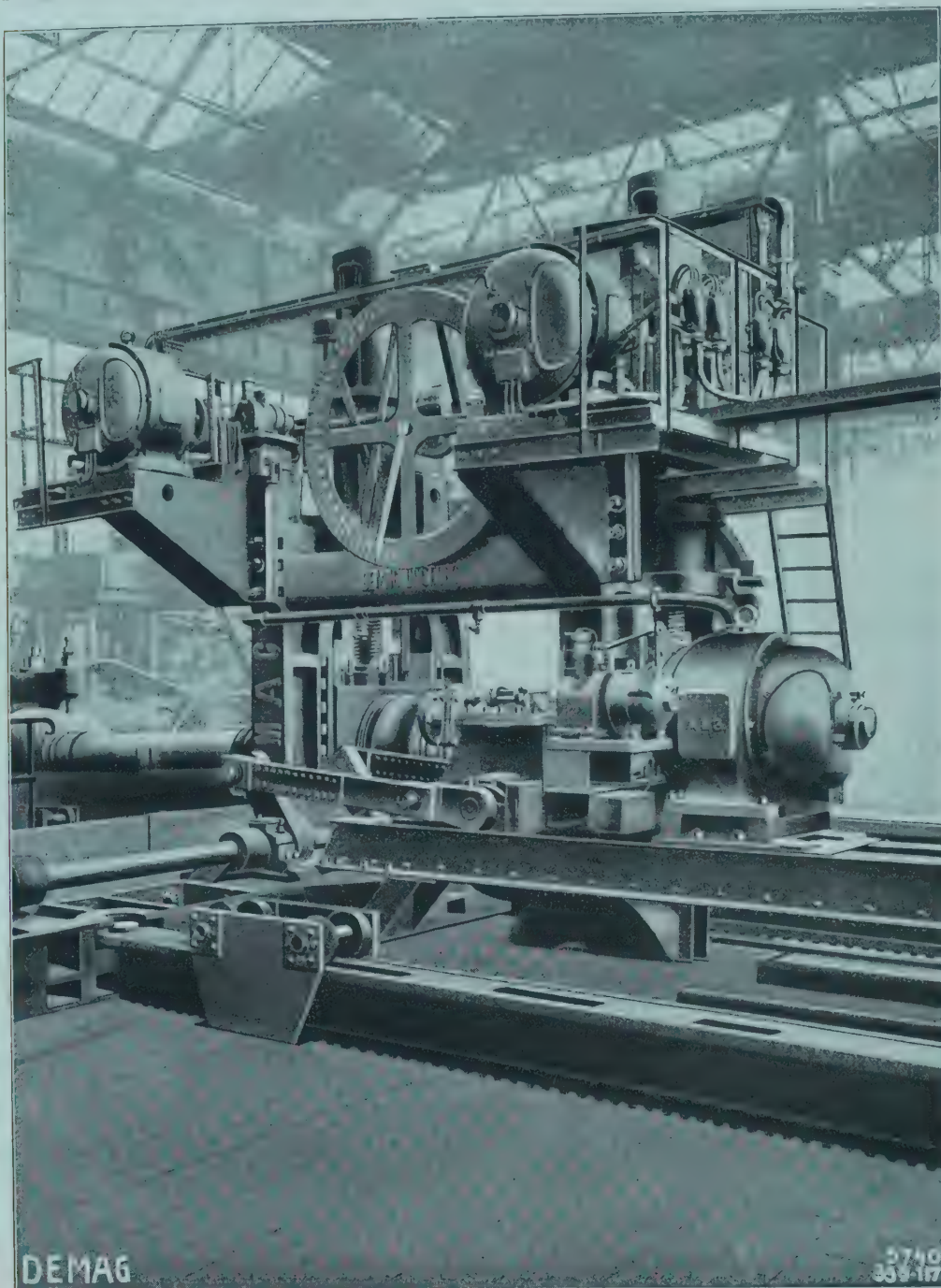


Delivered for  
Alti Forni e Fonderia  
di Piombino,  
Società Anonima  
Piombino, Italy.

**I**n this rolling mill, in which blooms up to 4000 kilos in weight can be rolled, the adjustment of the upper roll is effected, by means of a substantially guided rack, by two horizontal hydraulic plungers built into the top of the housings.

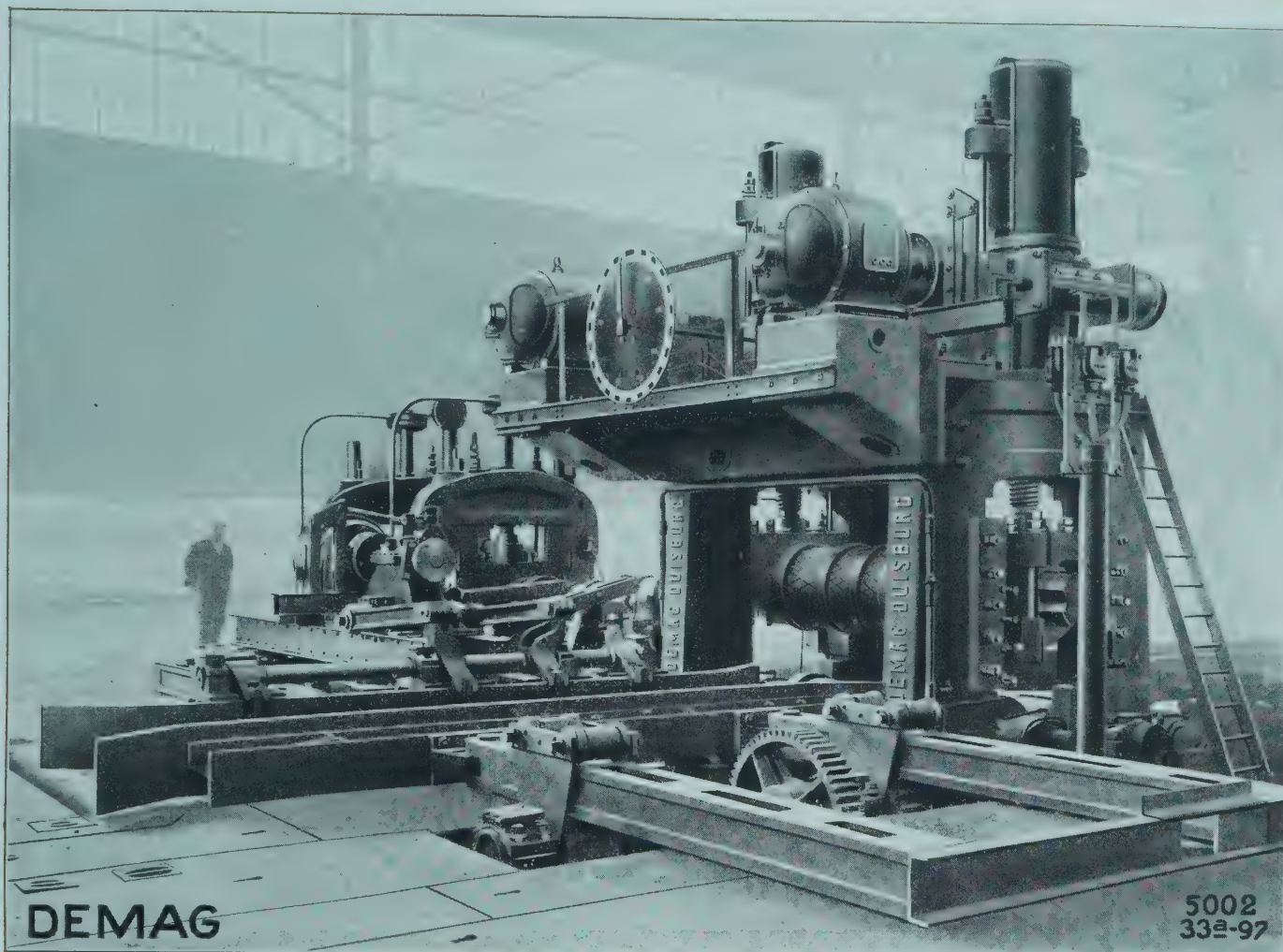


TWO HIGH REVERSIBLE HOUSINGS (1150 mm.)  
ROLLING BLOOMS UP TO A WEIGHT OF 5 TONS



VEREINIGTE HÜTTENWERKE BURBACH-  
EICH-DÜDELINGEN, AKTIEN-GESELLSCHAFT  
WERK ESCH, ESCH AN DER ALZETTE





TWO HIGH REVERSIBLE BLOOMING MILL (850 mm.) / DELIV.  
TO THE SOCIÉTÉ ANONYME D'ATHUS GRIVEGNÉE, ATHUS

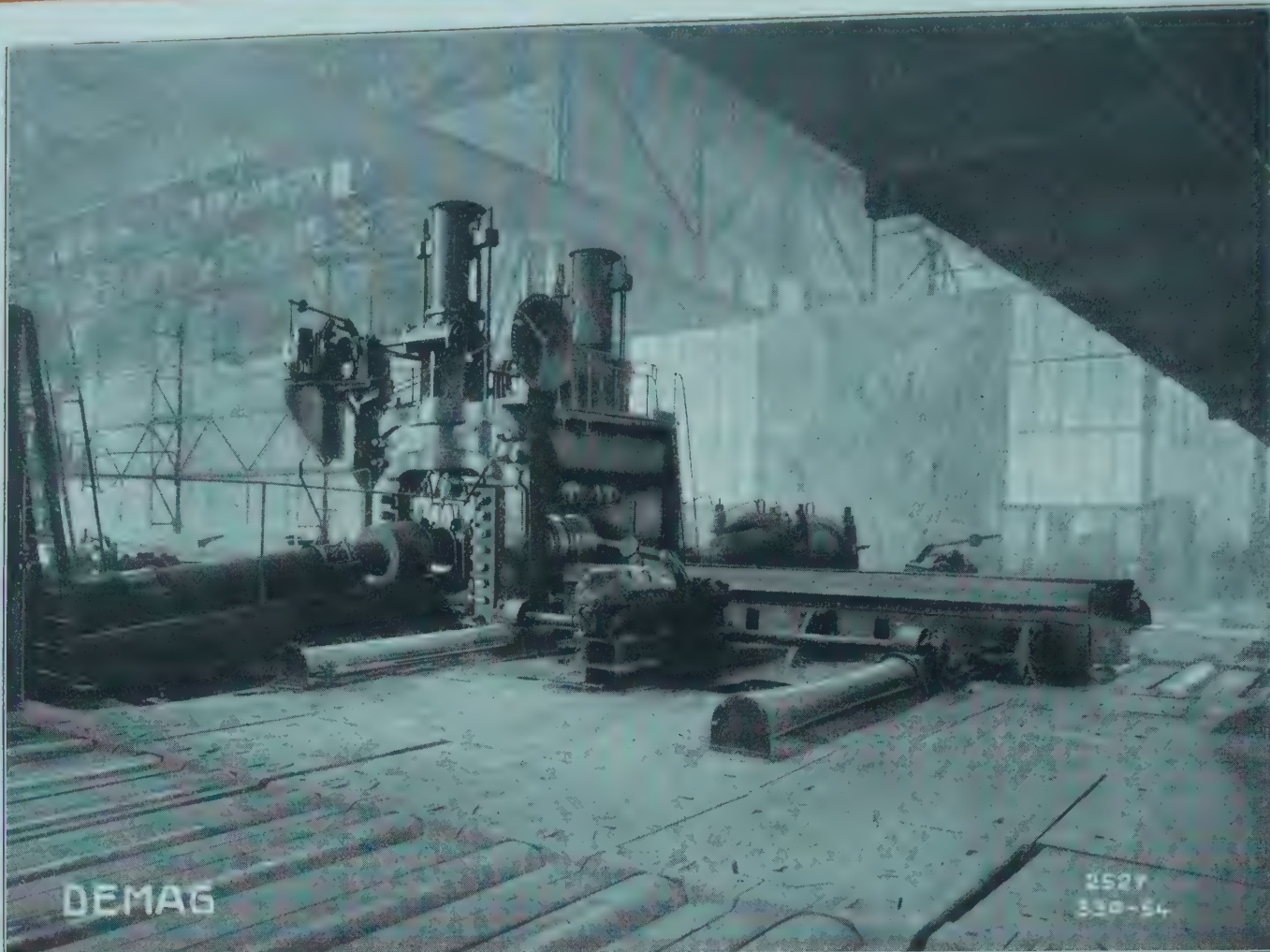
**A** billet mill is coupled direct to the blooming mill. The spring mounted top roll is provided with Demag patent electric adjustment. Electric shifting guides in connection with an electric tilting apparatus, Demag Type, are arranged in front and at the back of the mill.

Electric  
reversible rolling  
mill for billets and  
sheet billets.



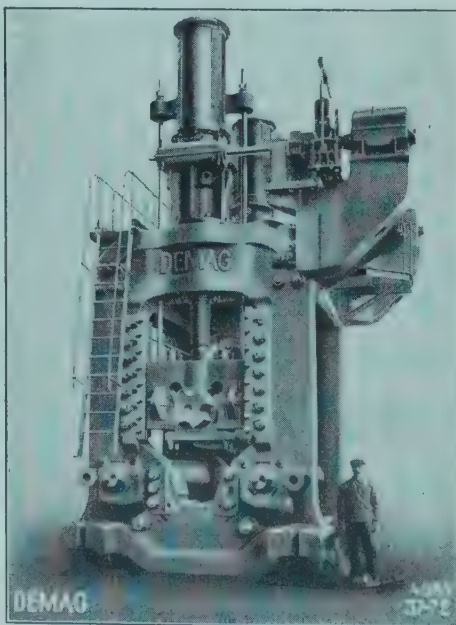
Delivered to the  
Rombacher Hütten-  
werke, Aktien-Ges.,  
Rombach i. Lothr.



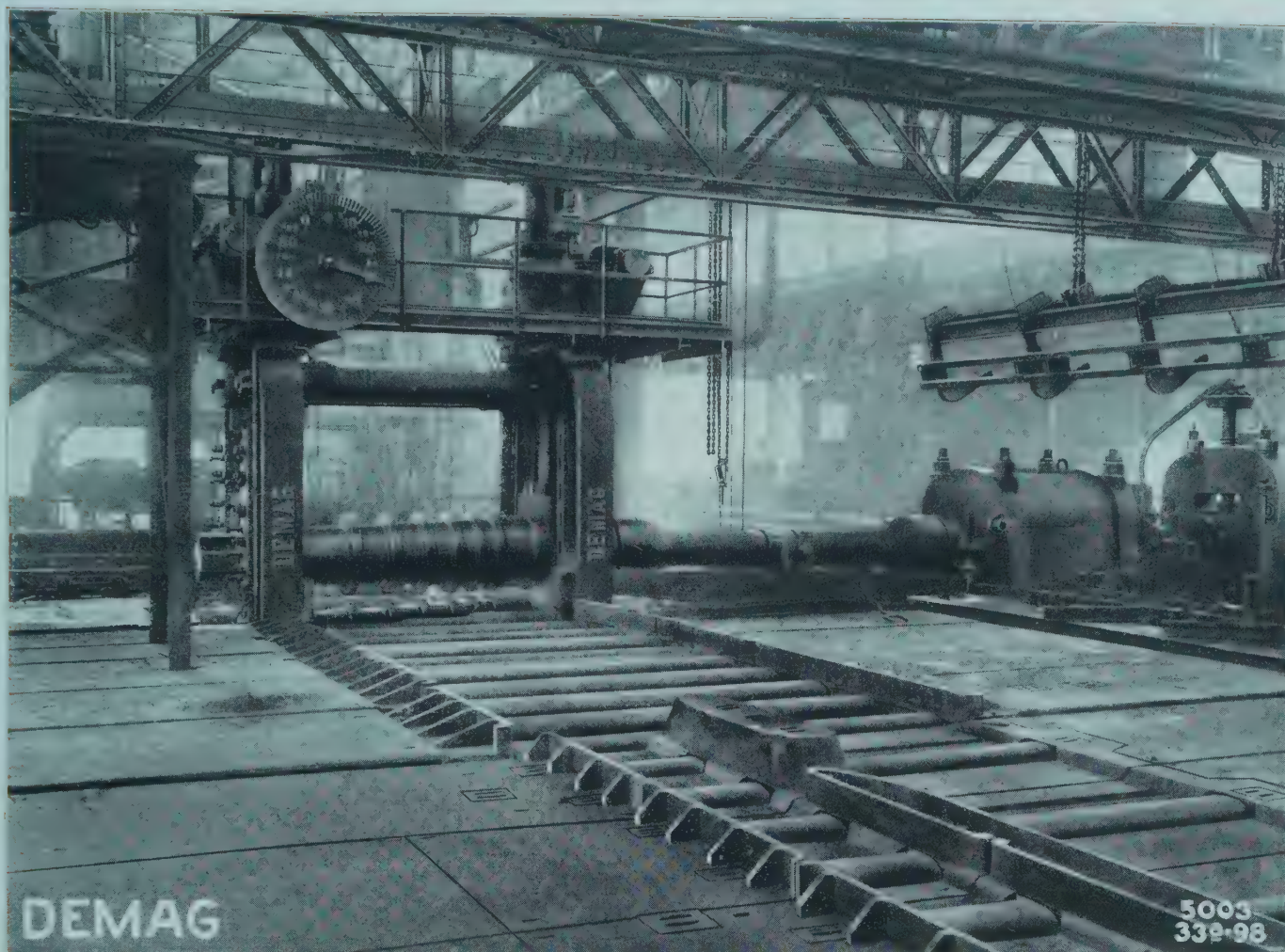


TWO HIGH BLOOMING MILL WITH BILLET MILL  
DELIVERED FOR A RHENISH METALLURGICAL WORKS

**T**he lower illustration, which represents the erection of the housings in our workshops, clearly shows the suspension and electric adjustment of our patent type of the top roll. The front rolls of the roller gear are stepped rolls, they are supported in the housings. In these housings the arrangement of the motors at the top sides of the housings is worthy of notice.





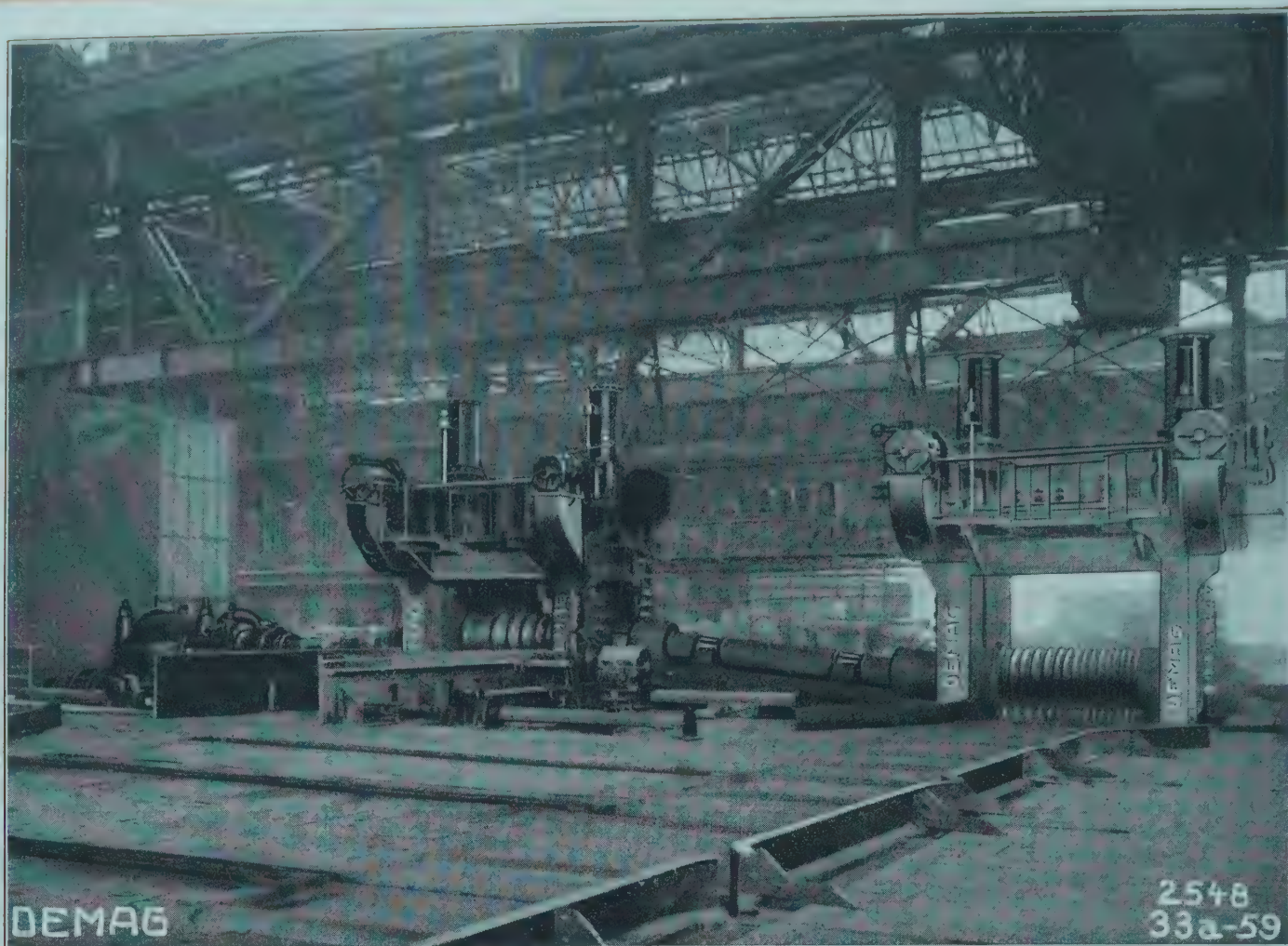


TWO HIGH REVERSING BLOOMING MILL (950 mm.) / DELIV. TO THE SOCIÉTÉ ANONYME D'OUGRÉE-MARIHAYE, DEPT. LA CHIERS, nr. LONGWY

**T**he blooming mill is coupled up to a section mill for which we delivered four travelling roller gears. At the top of the illustration to the right may be seen a transporting device with supporting claws, also delivered by us, which takes up the material after being roughly rolled in the blooming mill and lays it on the travelling roller gears. The lower cut shows the electric ingot tipper at the feed roller gear.







BLOOMING MILL WITH BILLET MILL COUPLED UP TO IT  
DELIVERED TO A RHENISH METALLURGICAL WORKS

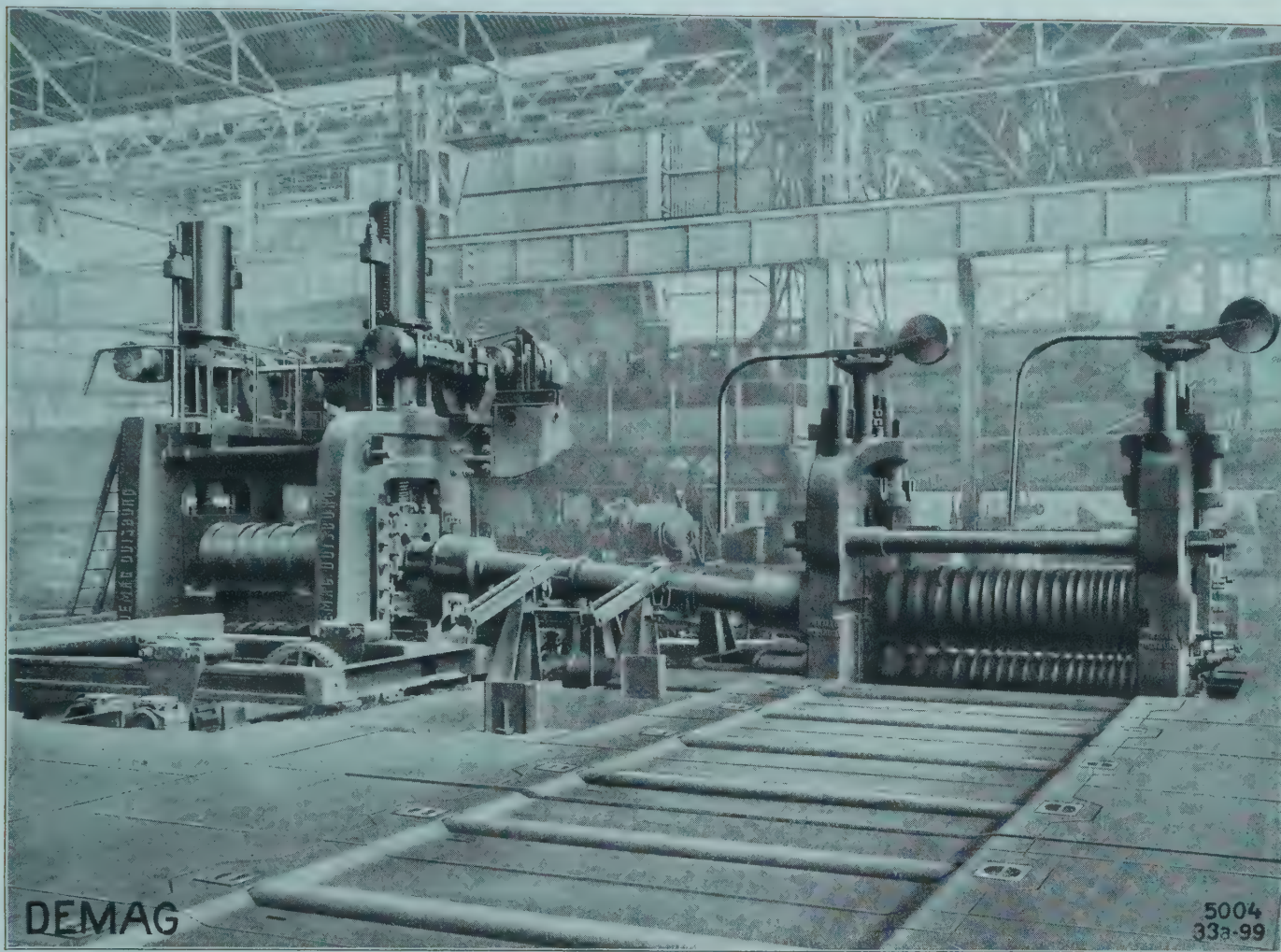
**I**n both housings the top rolls are spring mounted and fitted with Demag patent electric adjustment. The blooming mill is provided with a manipulator, System Demag. In the billet housings the tilting and shifting of the rolled bars ..... is done by hand. ....

# BEVEL ROLLER GEAR



DRIVEN BY ELECTRICITY

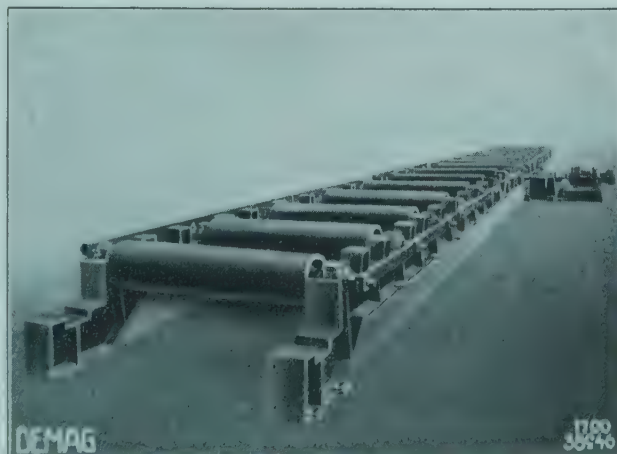




TWO HIGH BLOOMING MILL (850 mm.) WITH BILLET MILL  
DELIVERED TO THE SOCIÉTÉ ANONYME D'ATHUS GRIVEGNÉE, ATHUS

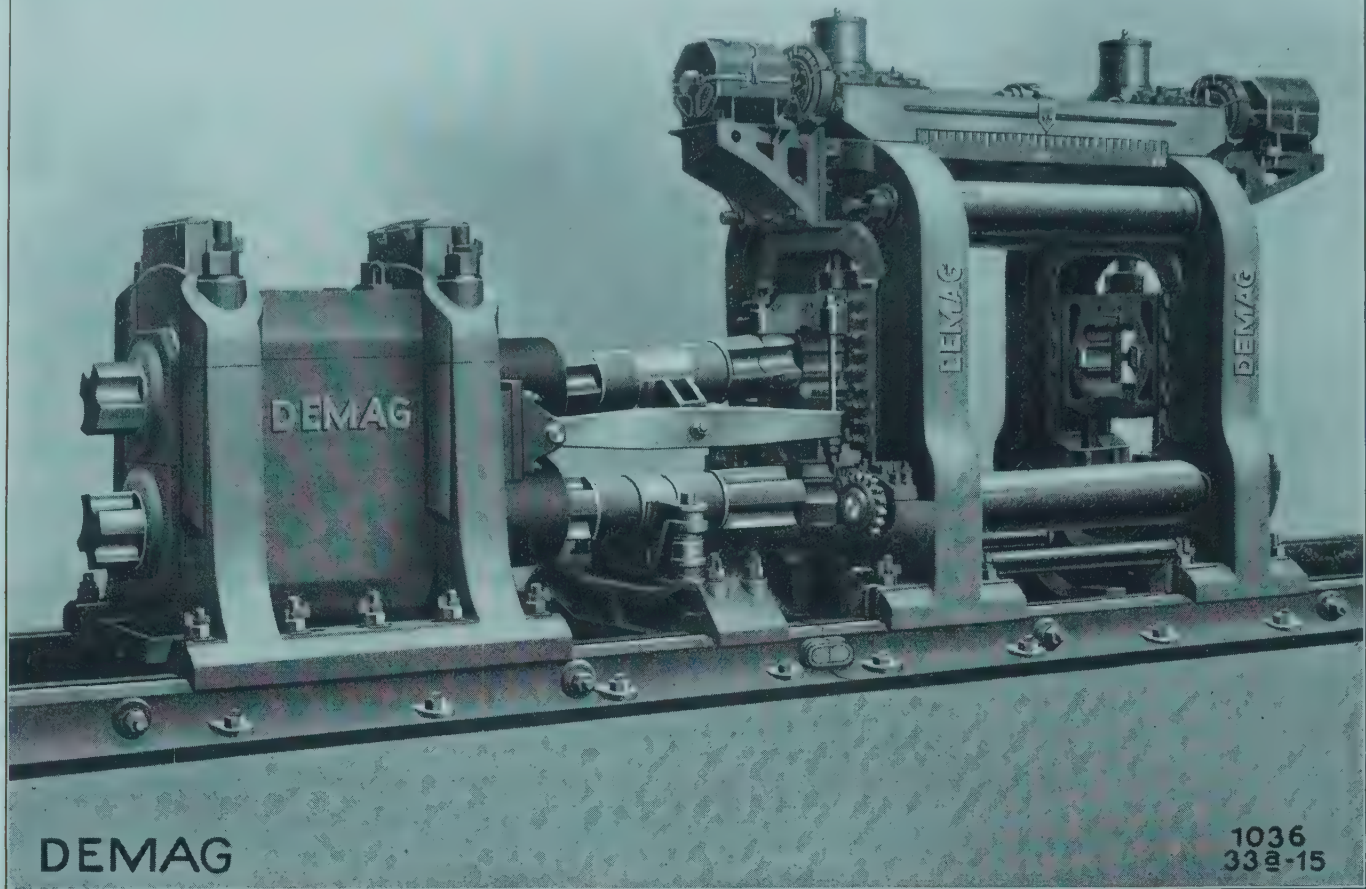
**T**he cut shows the rolling mill illustrated on page 27, seen from the shears situated behind the mill. The weight of the coupling spindles connecting the top rolls and of the coupling boxes is counterbalanced  
..... by weights hung in levers. ....

CRANK ROLLER GEAR DEMAG PATENT

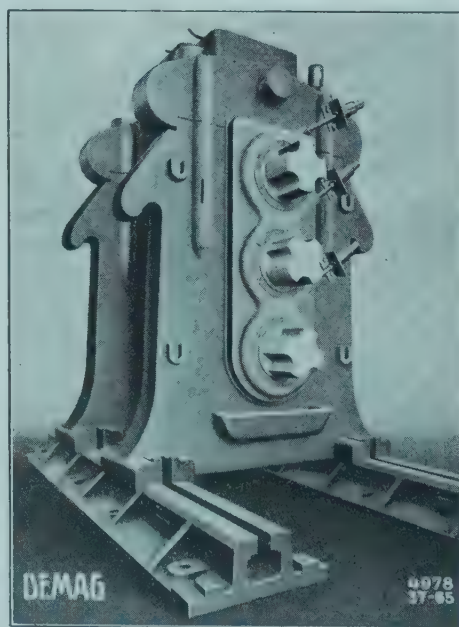


LARGE NUMBERS MADE





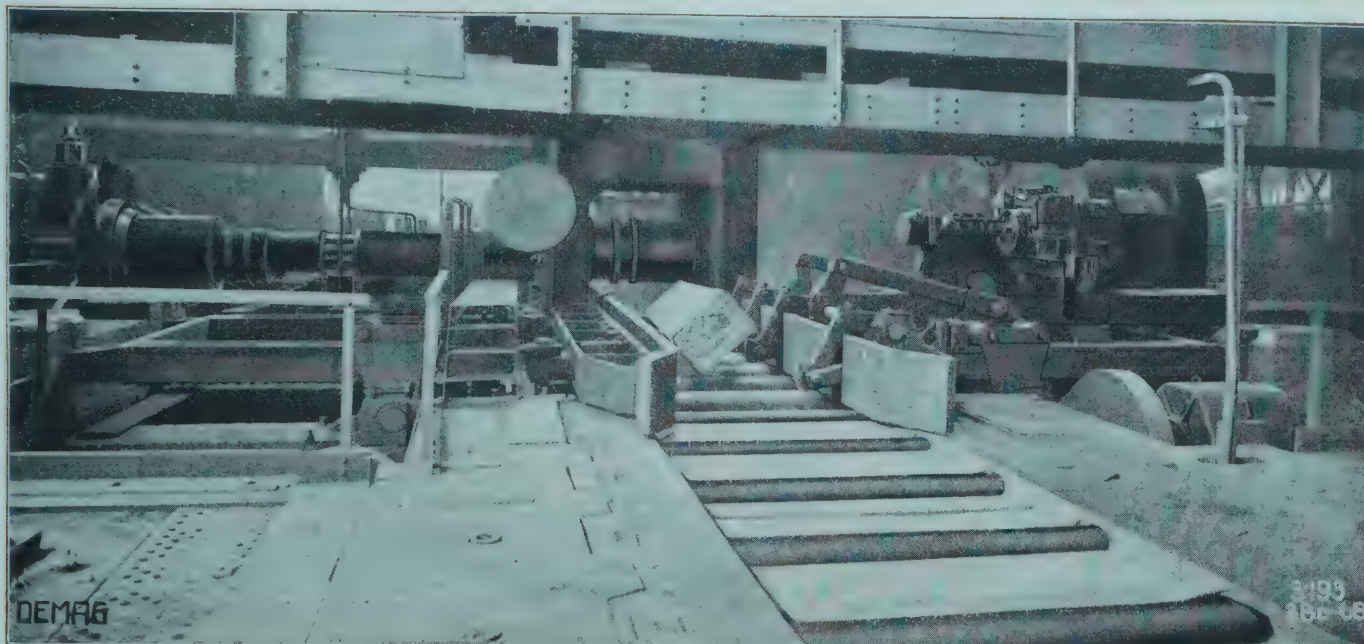
TWO HIGH BLOOMING AND PINION HOUSINGS FOR BLOOMING MILL WITH ROLLS 850 mm. IN DIAMETER / DELIVERED FOR THE WESTFÄLISCHE STAHLWERKE, BOCHUM IN WESTPHALIA



PINION HOUSINGS FOR A THREE HIGH MILL OF 750 MILLI-METER ARRANGED FOR GREASE LUBRICATION

Delivered for the Gelsenkirchener Bergwerks - Aktiengesellschaft, Depart. Adolf-Emil-Hütte, bei Esch an der Alzette.

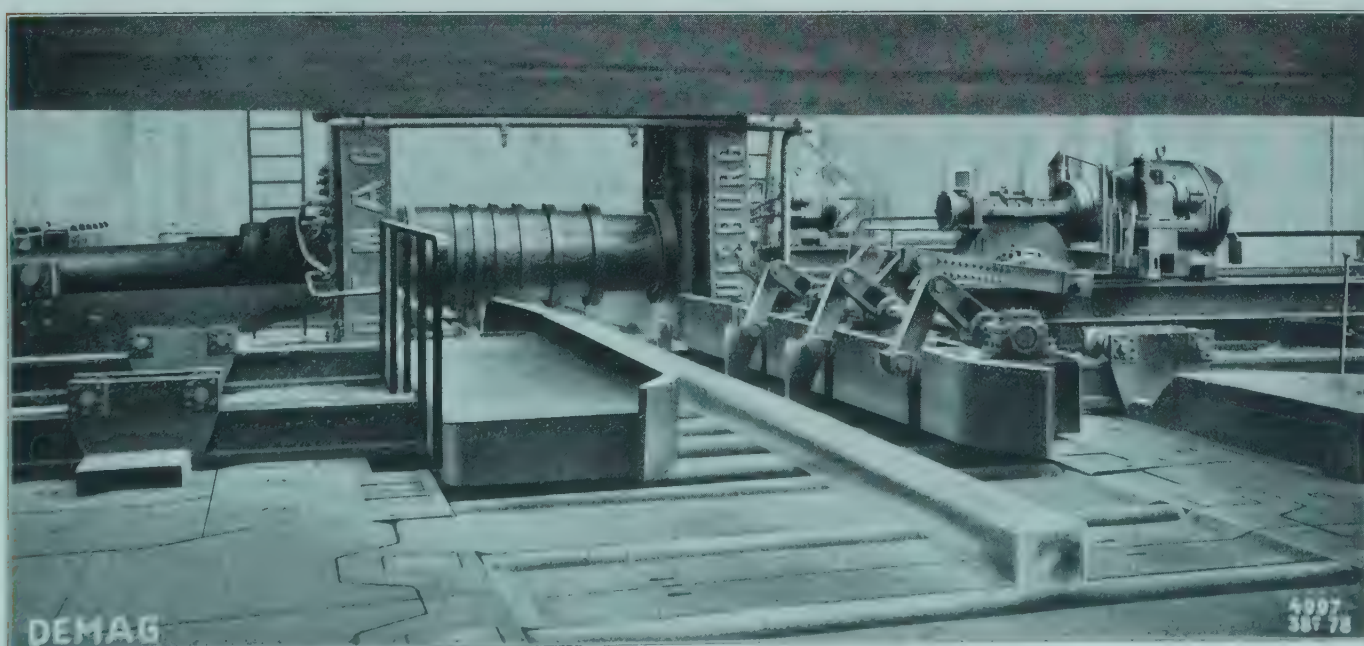




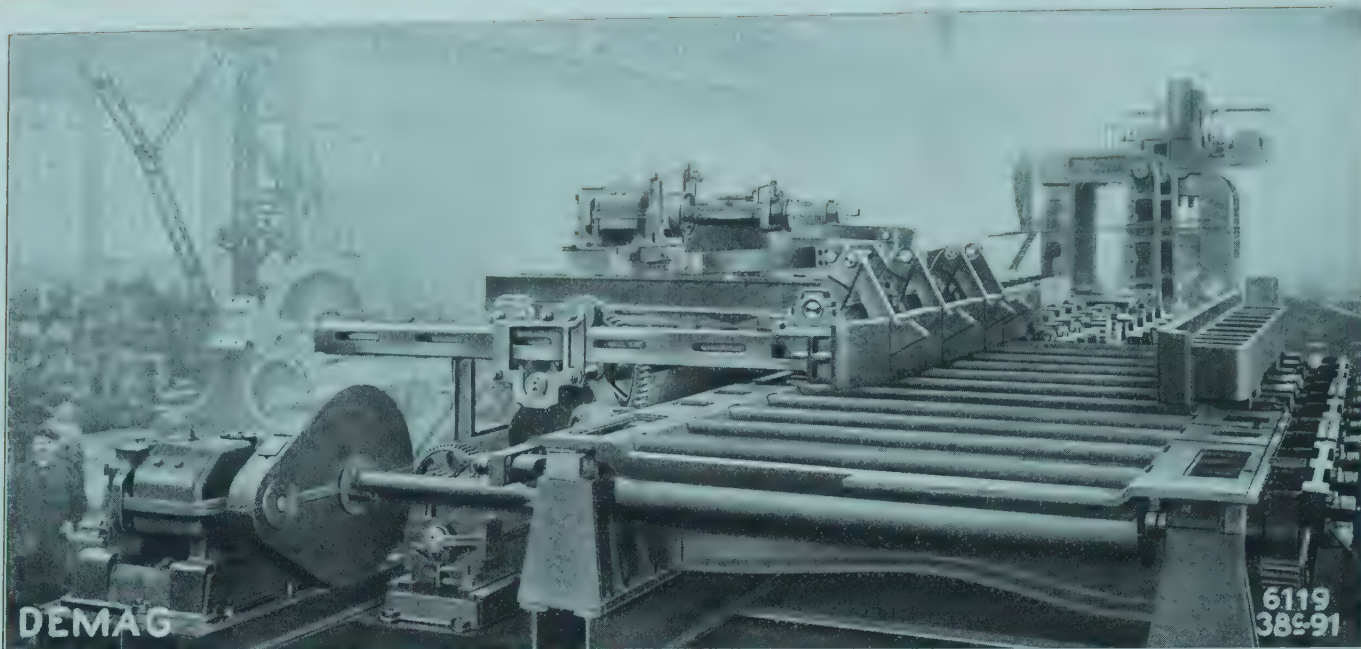
ELECTRICALLY DRIVEN MANIPULATOR FOR THE BLOOMING MILL  
DELIVERED FOR GEBR. STUMM, G. M. B. H., NEUNKIRCHEN-SAAR

## THE APPLIANCES FOR TILTING AND SHIFTING THE BLOOMS

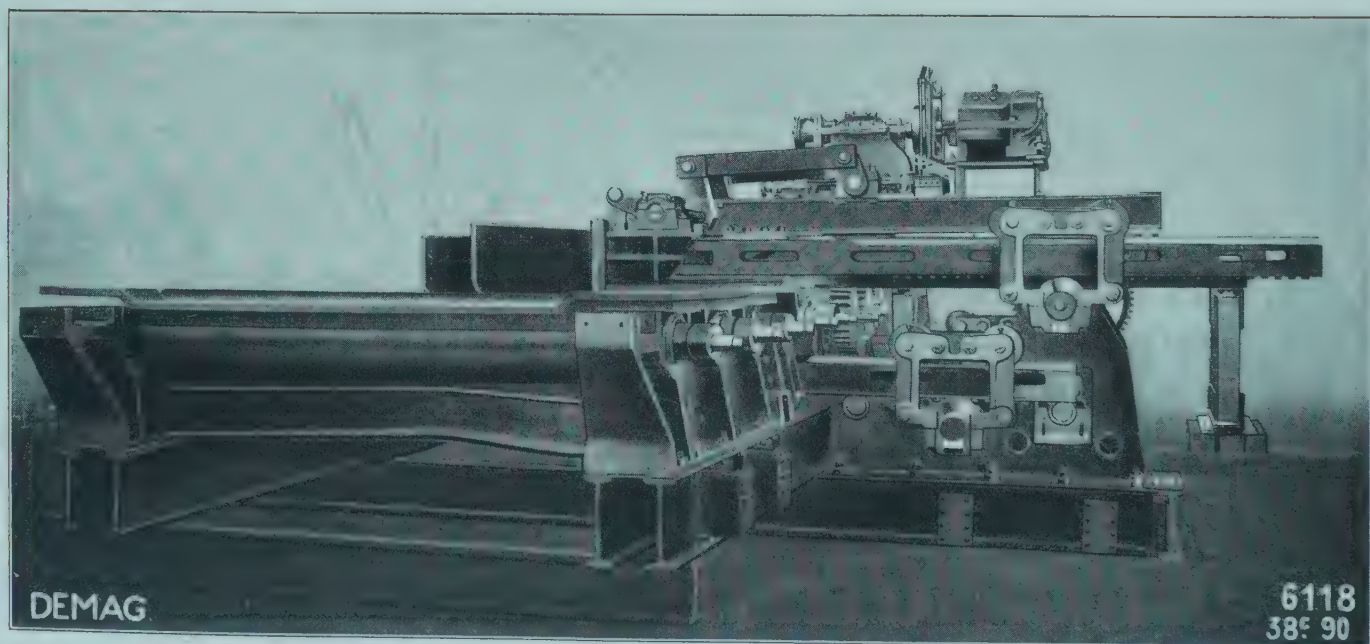
ELECTRICALLY DRIVEN MANIPULATOR – DEMAG TYPE – FOR A BLOOMING MILL (1150 m/m) / DELIVERED TO THE VEREINIGTE HÜTTENWERKE BURBACH-EICH-DÜDELINGEN, AKT.-GES., WERK ESCH, ESCH A. D. ALZETTE



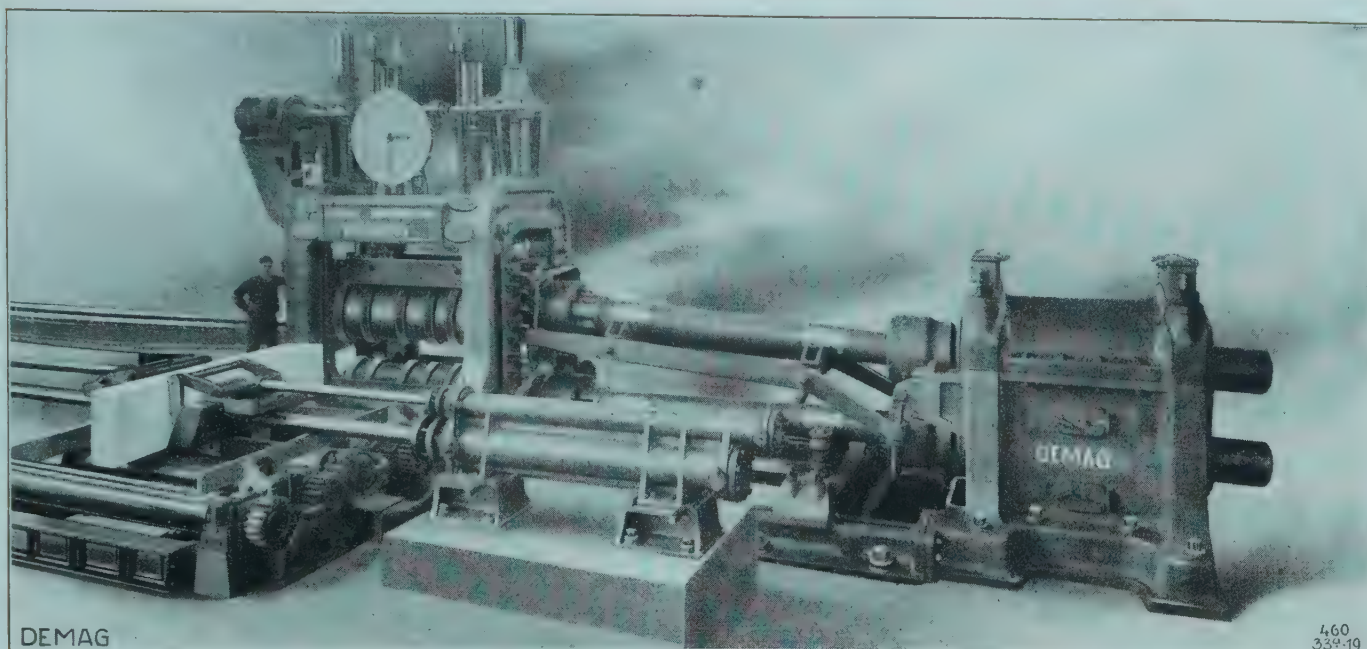




The manipulator, of which we have manufactured a large number, differs from other types in so far as all gear parts are outside the live roller gears and above the floor, so that they are easily accessible. The shifting device consists of two shifting frames before and behind the mill, which bear the actual shifting guides. Each of these guides is fitted with four tilting levers. These are moved by a special electromotor attached to the shifting frame, independent of the position of the guides. The shifting frames are conducted on roller gear traverses. Shoe brakes which are attached give a guarantee for exact and safe working.







HYDRAULICALLY DRIVEN MANIPULATOR WITH DEVICE FOR ERECTING THE SLABS, FOR A BLOOMING MILL DELIVERED TO THE IMPERIAL JAPANESE STEEL WORKS, YAWATAMACHI

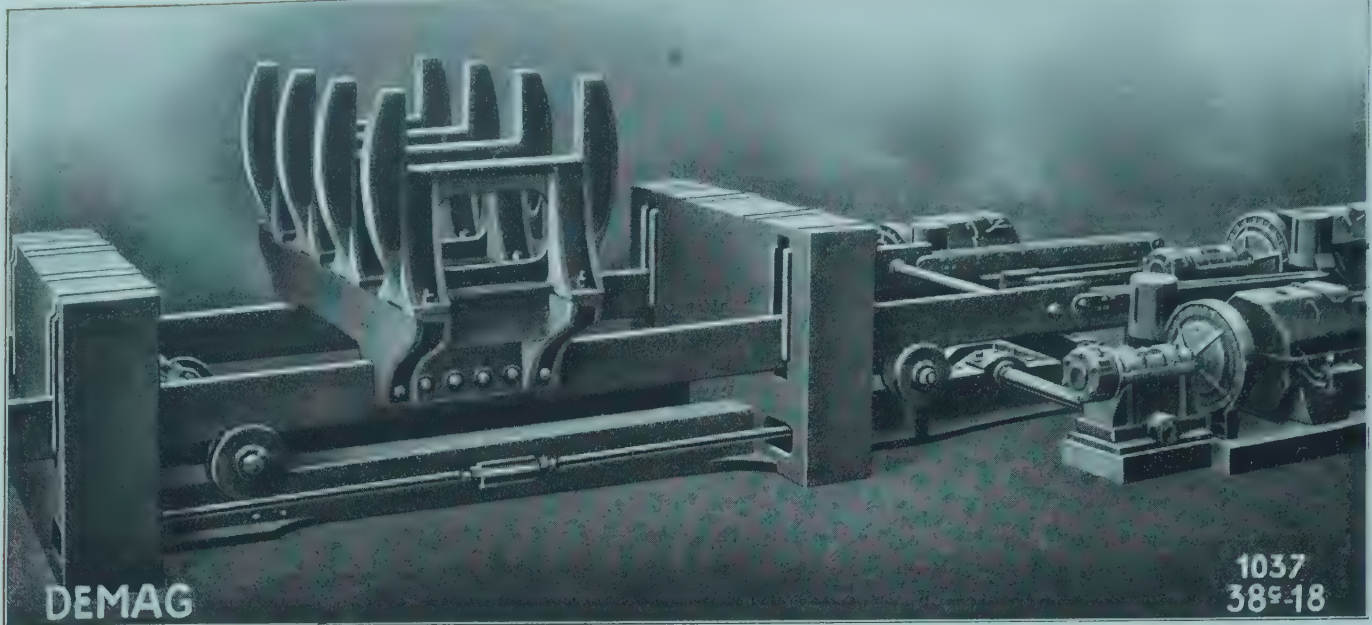
**T**he hydraulic filters shown in the illustration are so arranged that when both cheeks move simultaneously in the same direction the ingot is only shifted. If one of the cheeks is held tight the ingot will be turned by the other cheek so that its lower edge rises along the inclined surface of the fixed cheek, being thus tilted through an angle of  $90^\circ$ . If high and narrow slabs are to be conducted to the groove upright, it is necessary to provide special guide levers that are supported on the cheeks and can be worked by their own press plunger.

INGOT  
ROLLER GEAR  
with hydraulic  
manipulator  
for ingots  
up to 6000 kilos  
in weight.

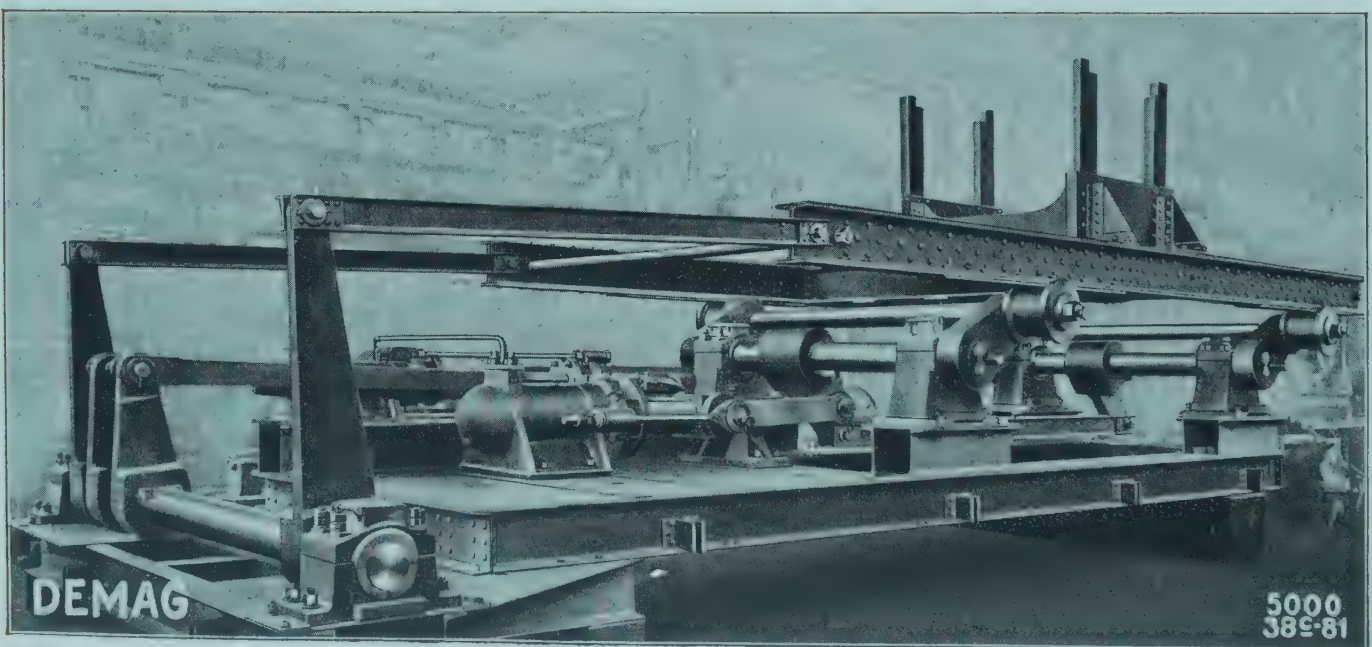


Deutsch-  
Luxemburgische  
Bergwerks- und  
Hütten-  
Aktiengesellschaft,  
Dept. Differdingen,  
Differdingen.

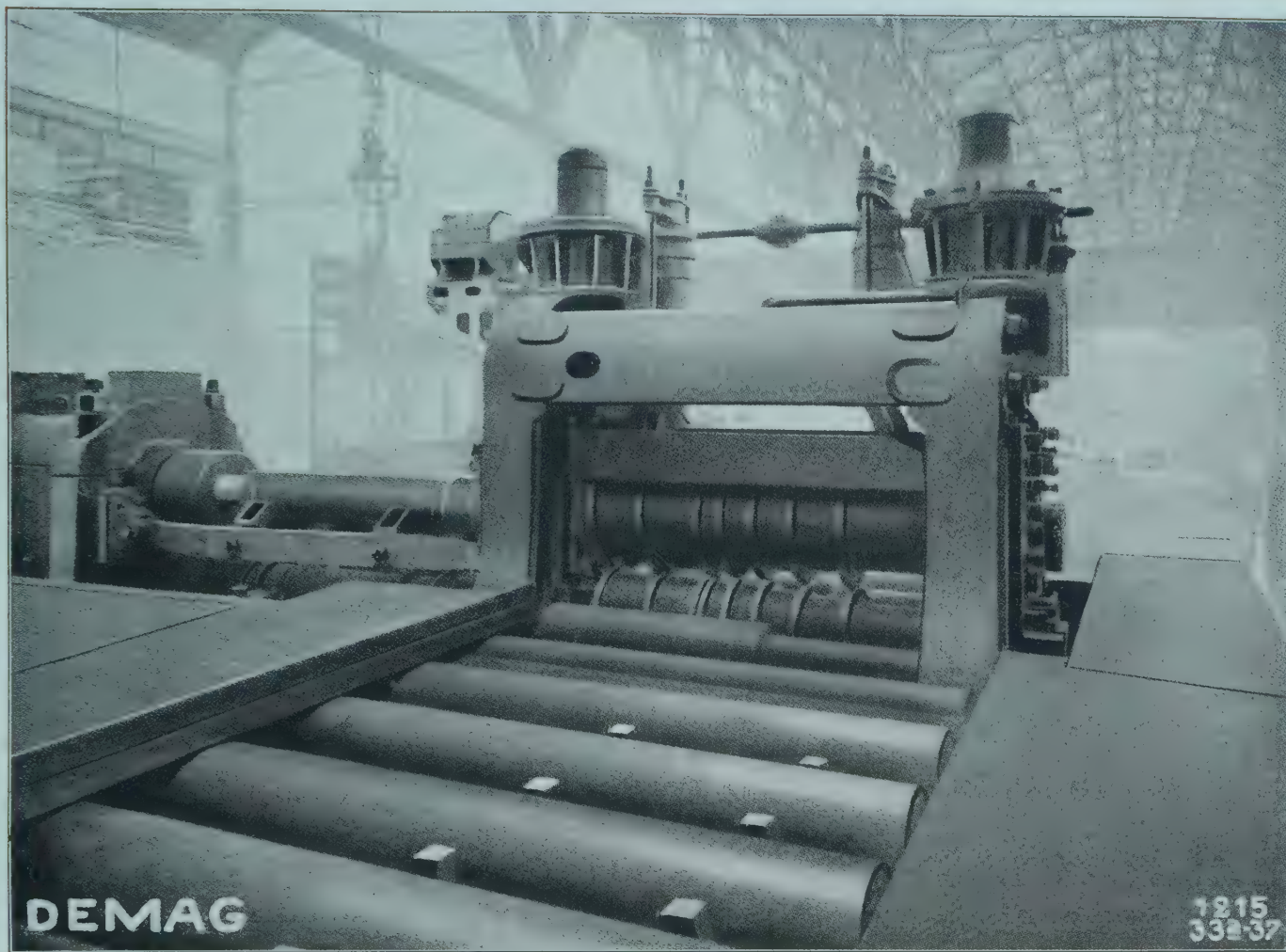




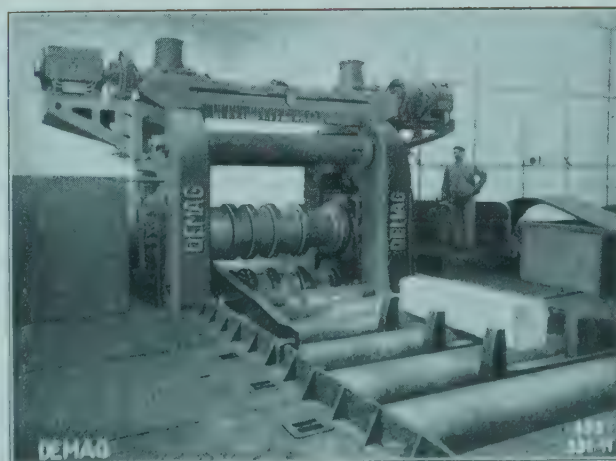
Besides the manipulators shown on the previous page we also build others with tilting and shifting tappets lying beneath the roller gear and which are capable of being raised and lowered. The tilting tappets, which are arranged in threes and fours, one behind another, are supported on one common frame resting on rollers which can be raised or lowered by means of reciprocating levers. This tilting device can either be driven by electricity as shown above or by hydraulic power as illustrated below. In this type, too, no part of the drive lies beneath the roller gear, so that the mill scale can cause no wear and tear.







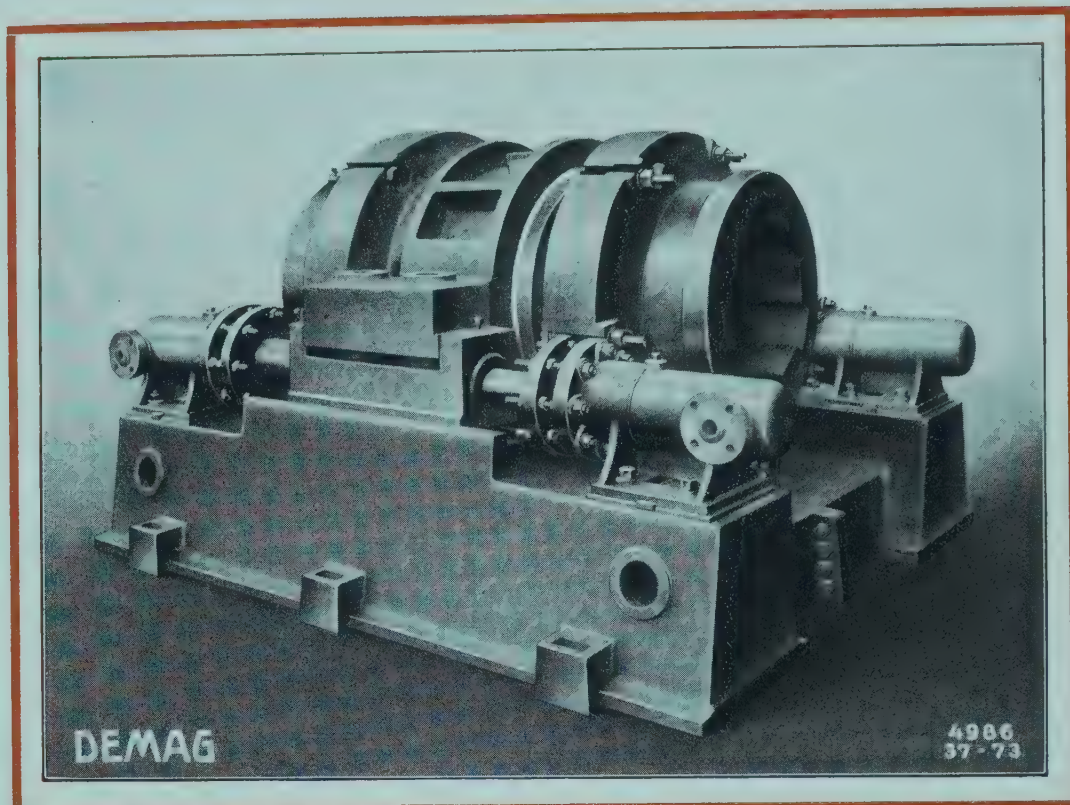
These two cuts show manipulators of the type described on the previous page, with electric drive. The upper illustration of a 900 mm. blooming mill delivered for the Société Anonyme d'Ougré-Marihaye, Département Rodingen, shows very clearly that in their lowest position the tilting tappets lie quite below the upper surface of the live roller gear, so that the approaching ingot cannot possibly injure them. The lower illustration shows the tilting apparatus on an 850 mm. blooming mill of the Westfälischen Stahlwerke, Bochum.





# HYDRAULICALLY WORKED MAIN COUPLING

FOR THE BLOOMING MILL / DELIVERED BY US TO THE  
TATA IRON & STEEL CO., LTD., SAKCHI, BENGAL (INDIA)

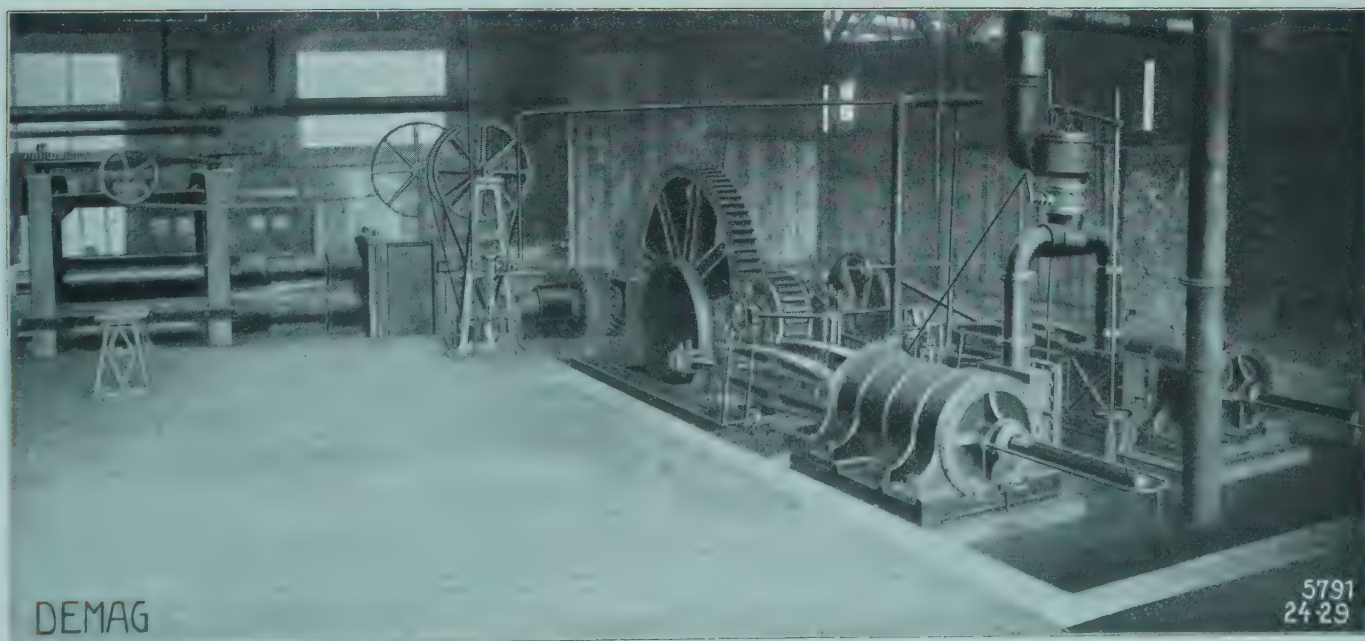


**T**his disengaging coupling serves to connect the 840 mm. blooming mill up to the three cylinder reversing steam engine used for driving it; the steam engine is provided with cylinders of 1300 mm in diameter and of 1300 mm. stroke. The four hydraulic pistons which actuate the coupling box are worked by pressure water at a pressure of 35 atm. The greatest length of this coupling is 2.5 metres, the outside diameter 1.3 metres.



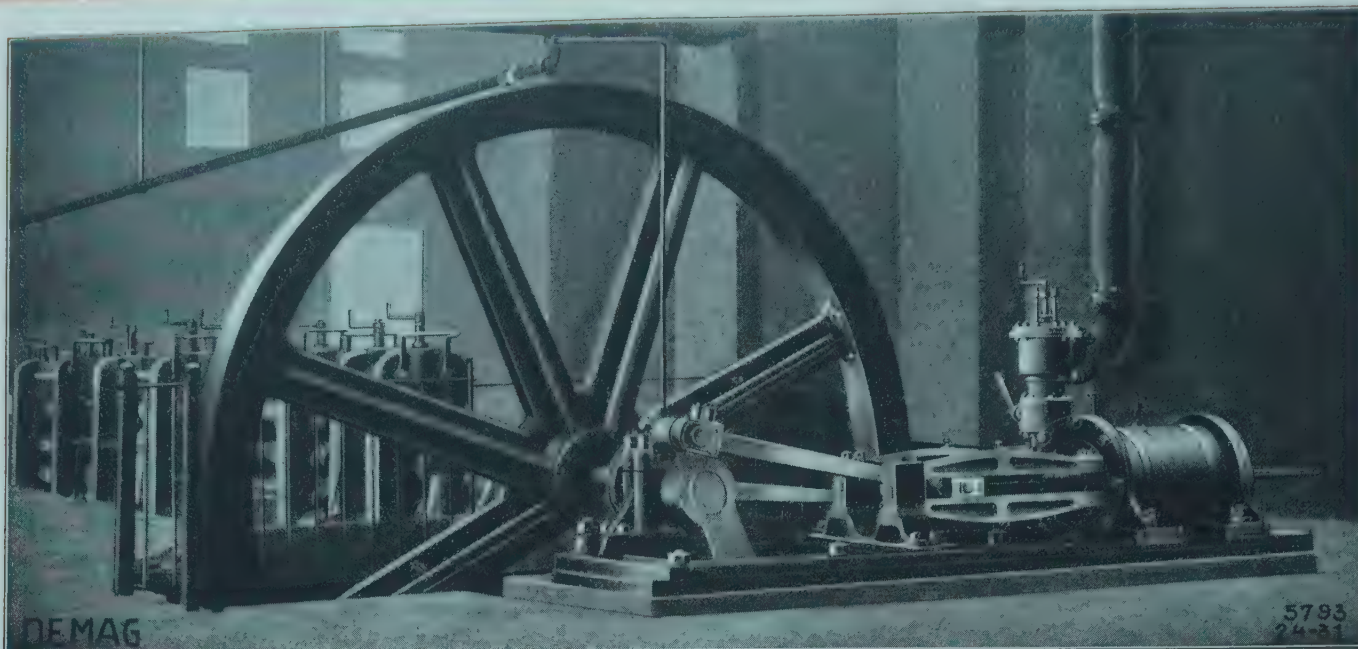
# ROLLING MILL ENGINES

**F**or driving rolling mills steam engines, big gas engines or electromotors are employed according to local circumstances, and these are either coupled up to the mills direct or drive them by means of belt ropes or tooth gear. The steam engines built by us for running rolling mills are designed as compound engines with the cylinders lying one behind another, or as direct current steam engines according to a patented system. They are designed to rotate in one direction only or as reversible engines, according to the requirements of the rolling mills to be driven, and have of late been constructed mostly as twin tandem engines. A large number of steam engines have been turned out from our workshops at Wetter-Ruhr and Duisburg which have been erected for driving rolling mills, most of which were also delivered by us. Our engines, at the perfecting of which we have worked unceasingly for nearly a century, availing ourselves of all the experience gained in the meantime, are noted for their pleasing and powerful construction, and for the ease with which they can be supervised. They are constructed for steam pressures up to 14 atm. above atmospheric and for the maximum degree of superheating. They are very easily manageable and their consumption of steam is very low.

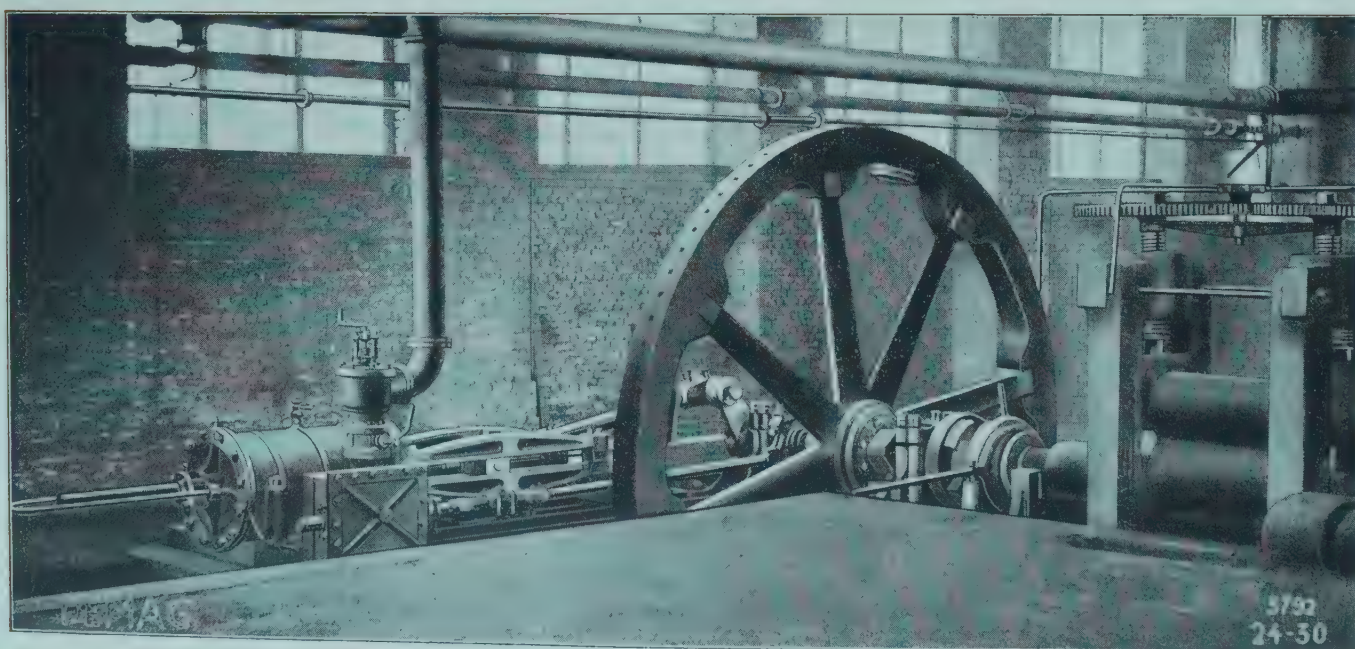


OLD ROLLING MILL ENGINE WITH CYLINDER OF 30 INCHES DIAMETER AND 5 FOOT STROKE FOR A PLATE ROLLING MILL

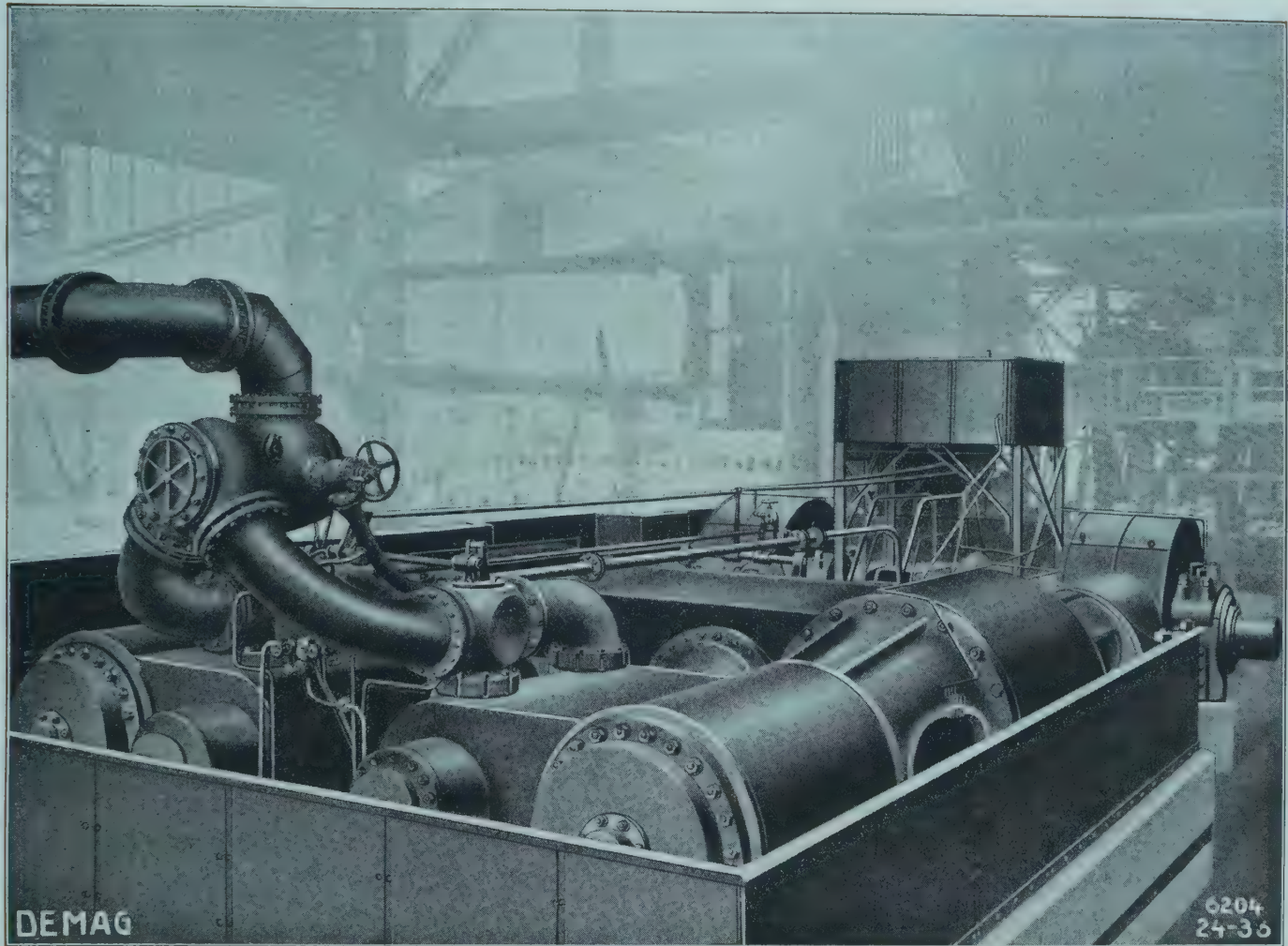




**T**he rolling mill engines illustrated on this page were built in our workshops and are provided with cylinders of 30 inches in diameter. The engine shown above drives a bar iron rolling mill, the one below a sheet rolling mill. These engines date back to about the fifties of last century and, compared with the up-to-date engines illustrated on the following pages, give a good idea of the enormous development in this branch of machine building.



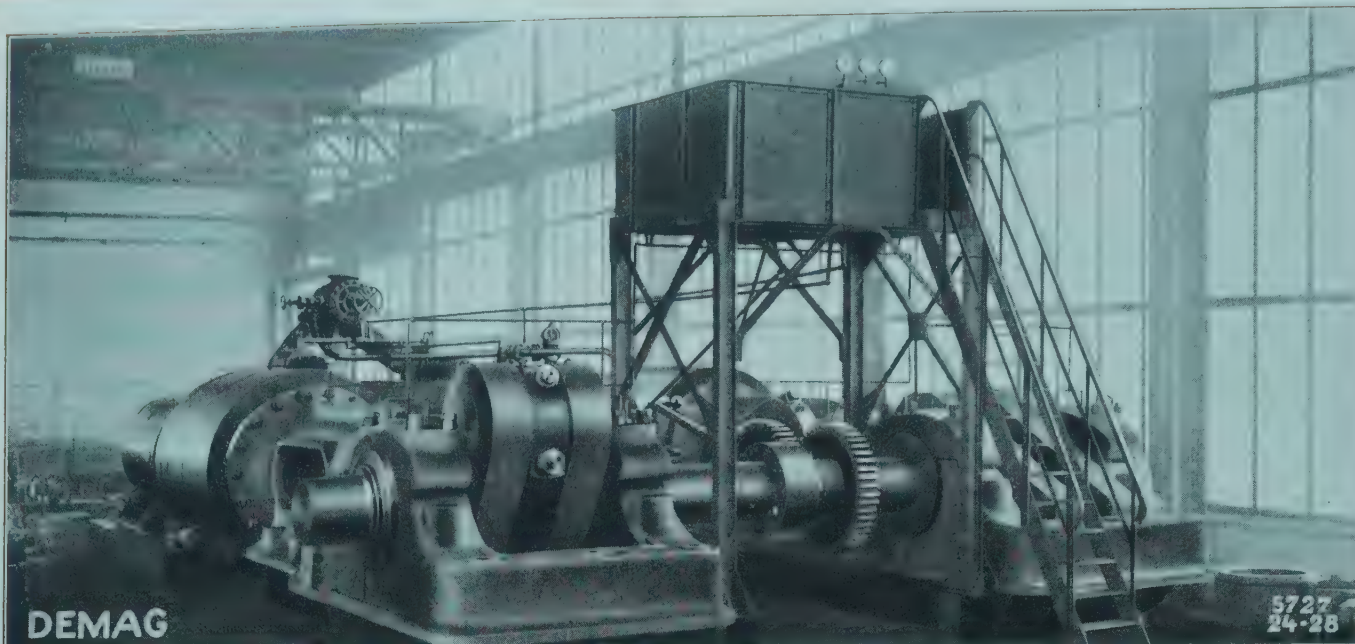




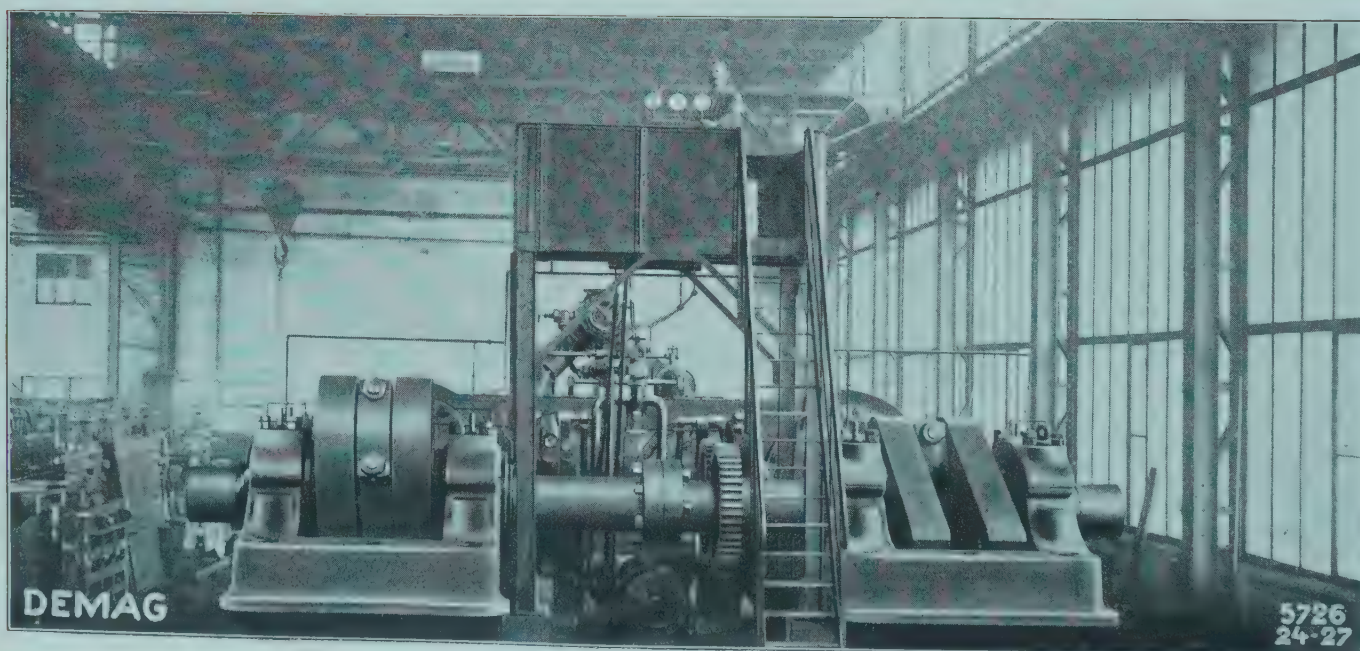
TWIN TANDEM REVERSING ENGINE FOR THE GELSENKIRCHENER BERGWERKS-A.-G., DEPT. AACHEN. HÜTTENVEREIN, AACHEN-ROTHE-ERDE

**T**his engine is one of the largest rolling mill engines driven by steam that has ever been built. It is used for driving a heavy girder rolling mill. The four cylinders have diameters of 1200 and 1800 mm. respectively. The piston has a stroke of 1500 mm., the maximum speed is 180 revolutions per minute. With a steam pressure of 10 atm. and a speed of 150 revs. per min. the engine develops about 20000 H.P.

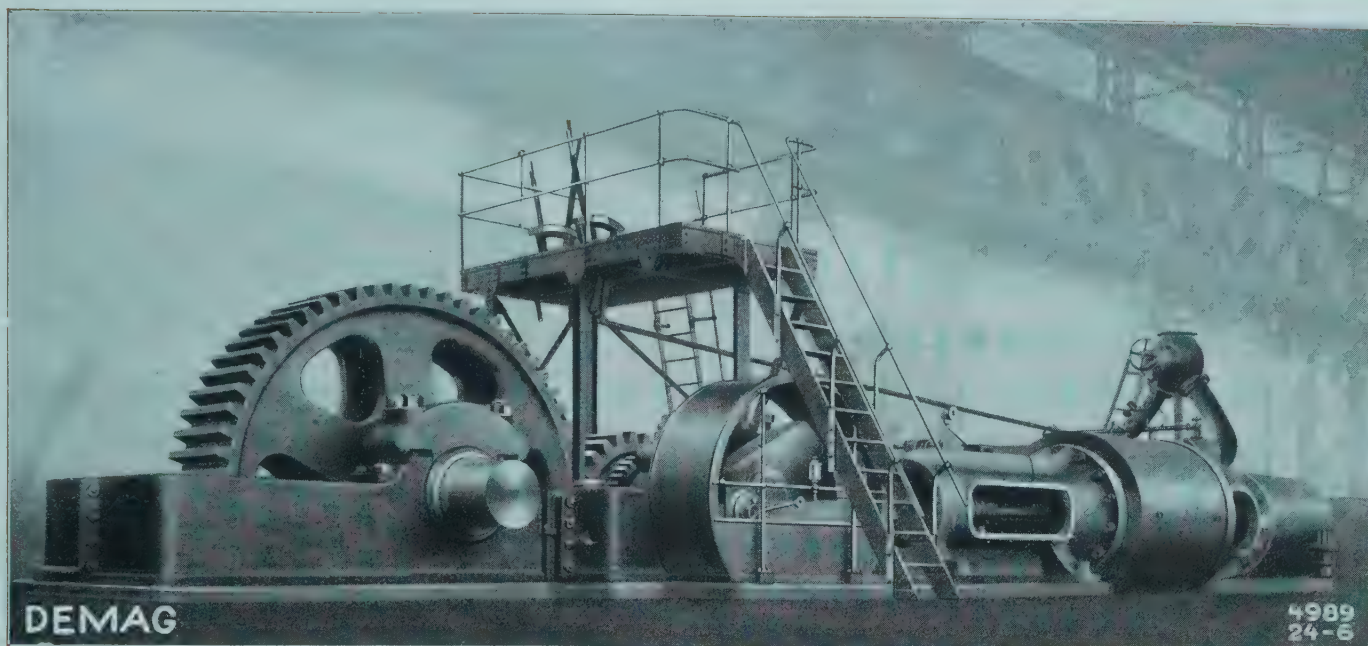




These illustrations show the engine depicted on the previous page whilst in course of erection in our workshops at Duisburg, and give a good idea of the tremendous size of the engine. The high pressure cylinders lie behind the low pressure ones. The piston rods are supported by bearing shoes fixed in the intermediate pieces which connect the high and low pressure cylinders, the weight of the pistons being thus extremely well distributed.

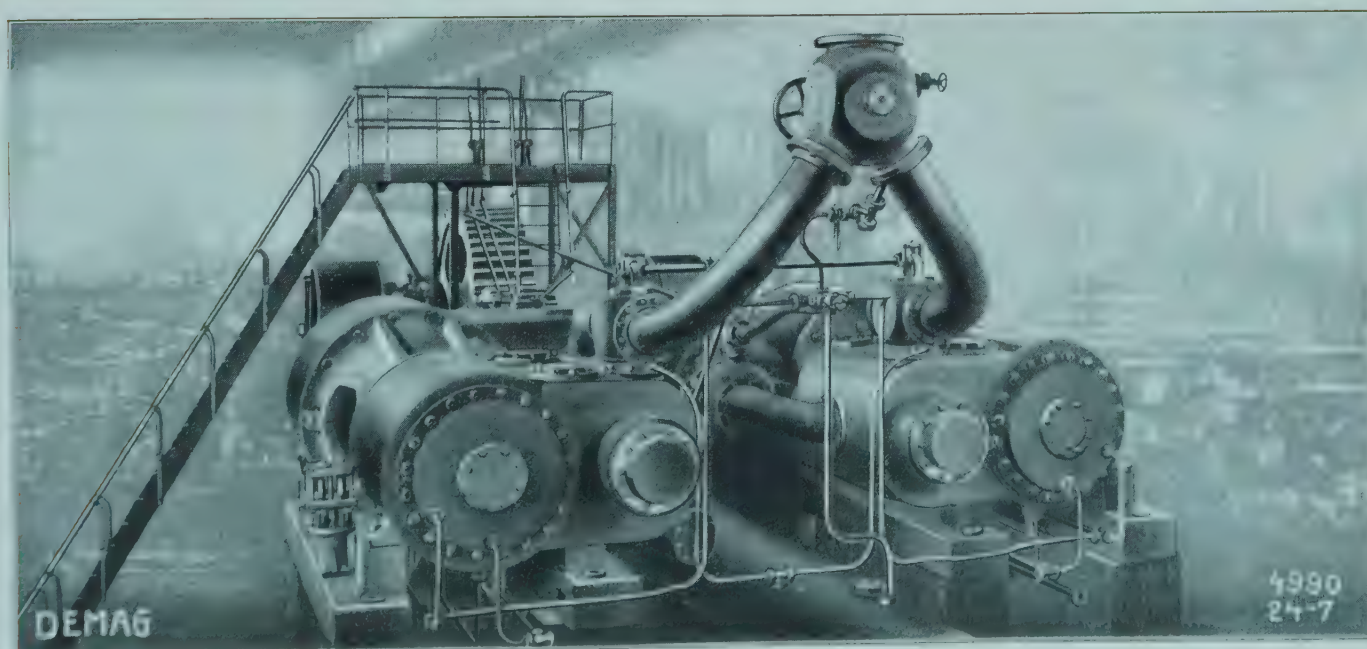




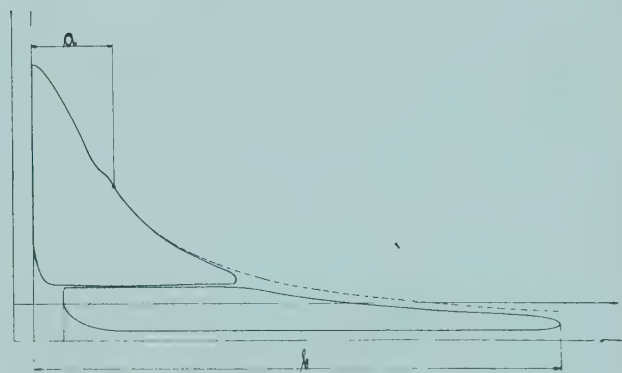
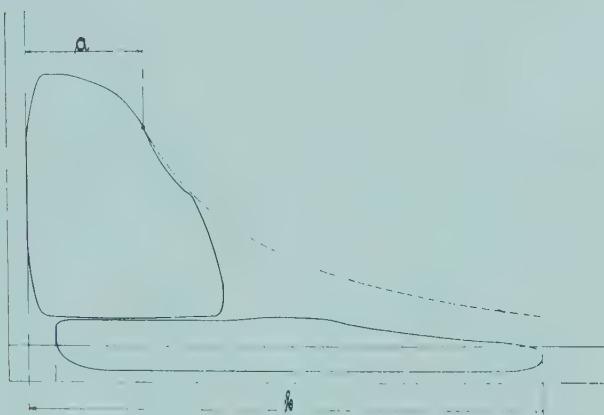
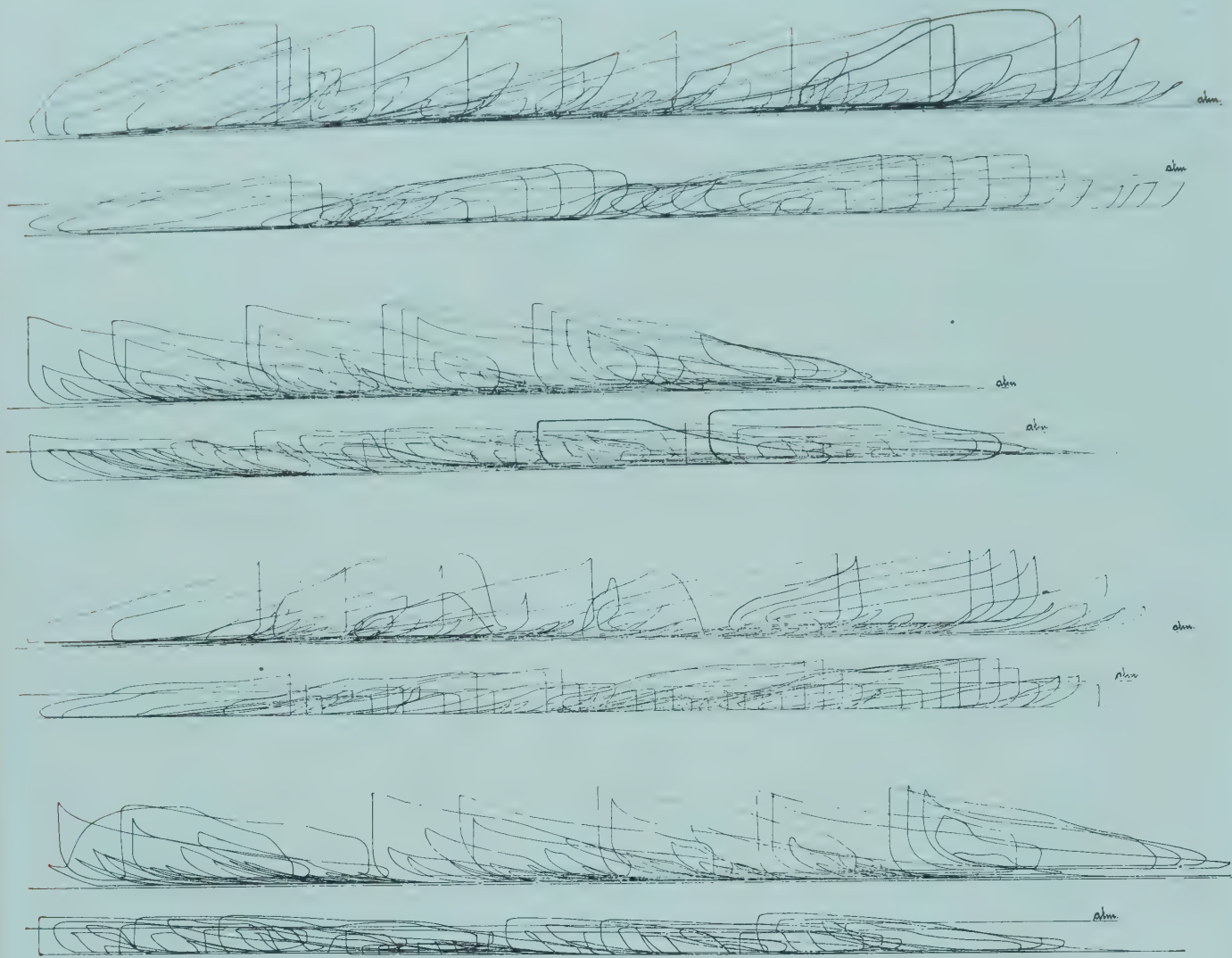


TWIN TANDEM REVERSING ENGINE / DELIVERED TO THE ROLLING MILL OF THE PUTILOW WORKS AT ST. PETERSBURG

**T**his steam engine, which was designed for a working pressure of 10 atm., drives a plate rolling mill with rolls of 950 mm. in diameter and 3.5 metres long. A spur wheel counter-shaft is built directly into the foundation frame of the engine. The reversing is effected by means of a steam hydraulic reversing engine.

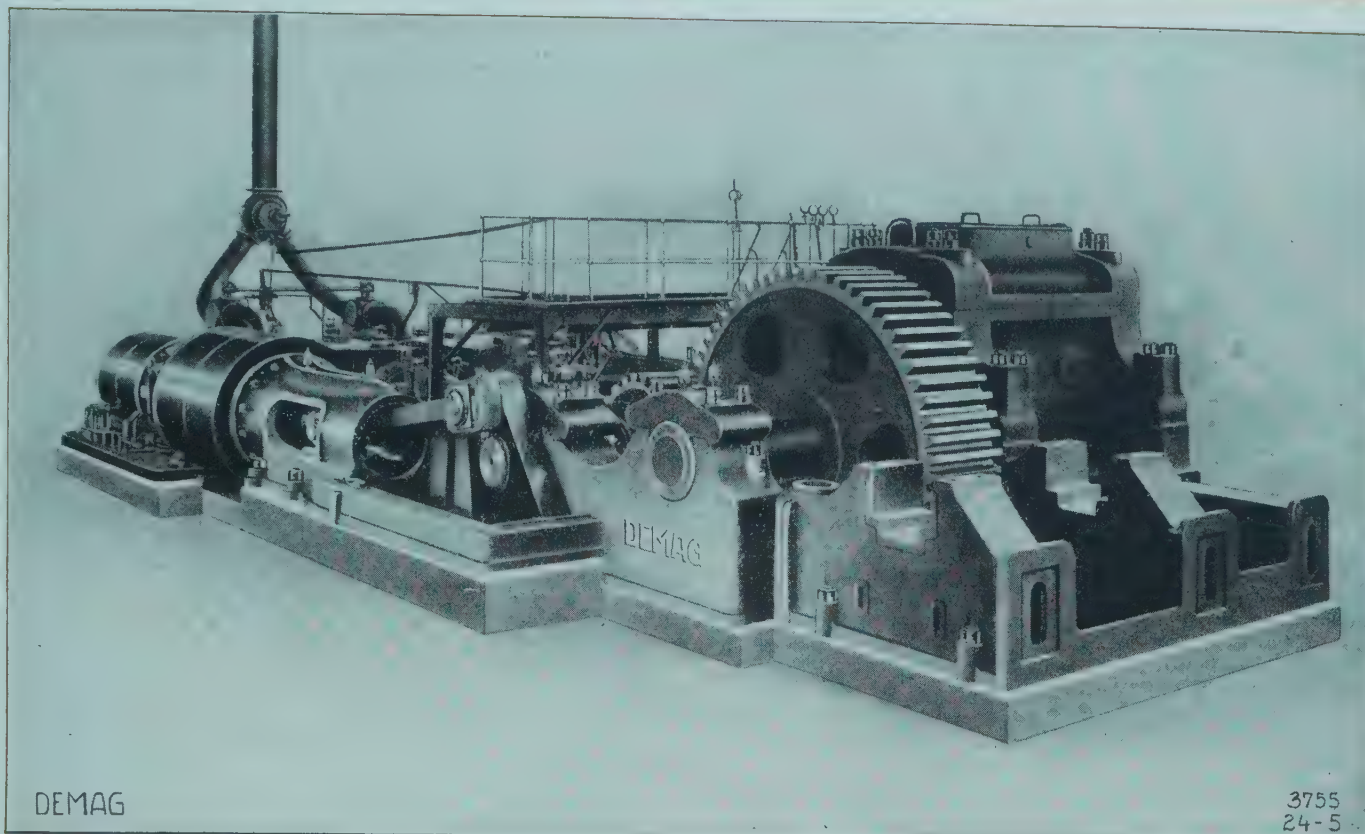






**INDICATOR DIAGRAMS**  
**FOR THE TWIN TANDEM REVERSING ENGINE**  
**ILLUSTRATED ON THE FOLLOWING PAGE**

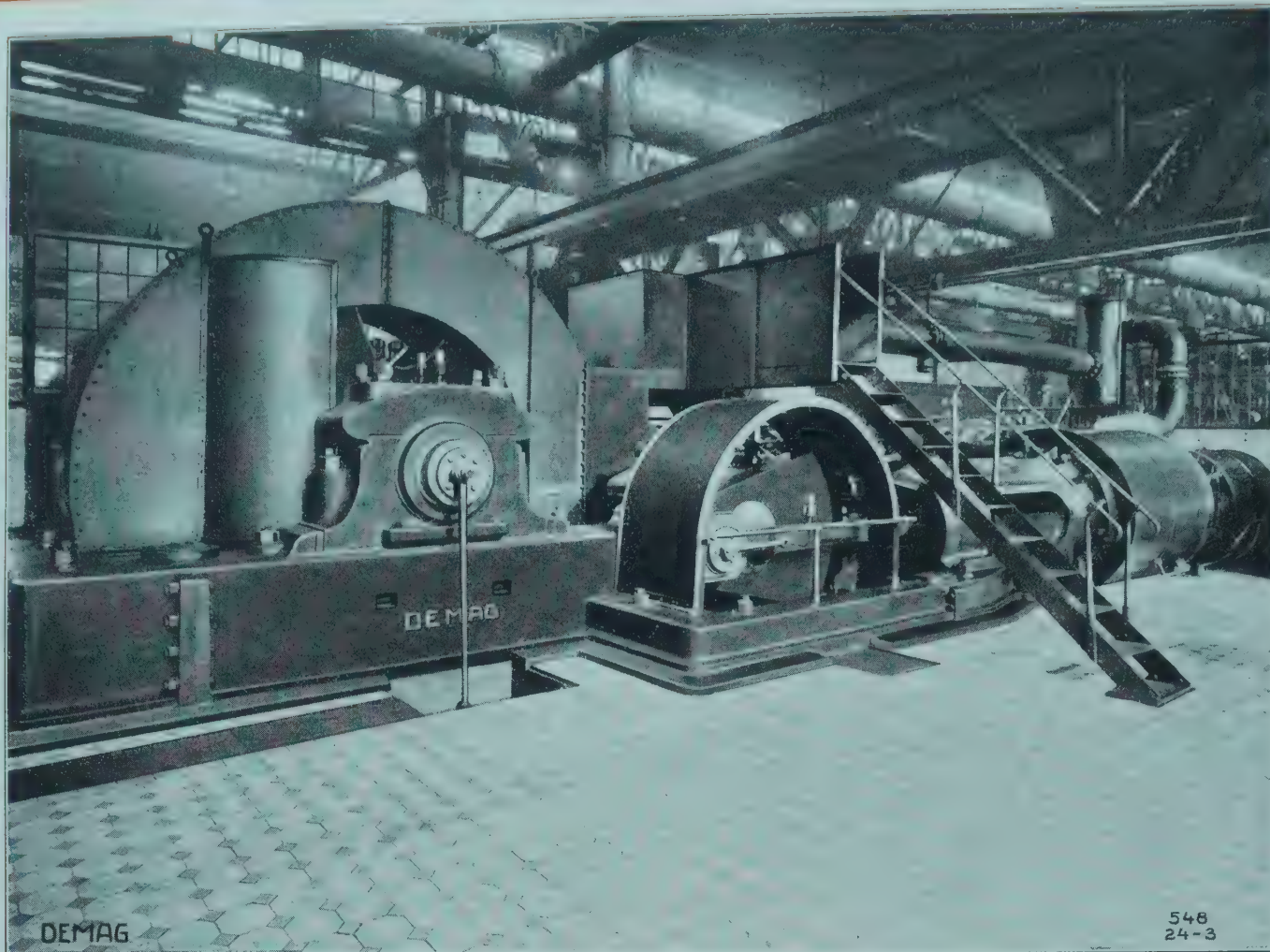




## TWIN TANDEM REVERSING ENGINE DELIVERED TO STEEL, PEECH & TOZER, LTD., SHEFFIELD

**T**he foundation frame of the engine was built in such a way that it could be erected on the same bed as an existing driving engine belonging to the rolling mill. The existing engine has been retained for use only in cases of emergency. The control gear of our reversible rolling mill engines is a patent link motion with one lever, the distributing slide valve having an adjustable lap. This construction possesses the following great advantages: — Large port openings, slight compression for all positions of the links, the distributing ports are quite closed when the link is at its central position, the distributing valve lies outside the cylinder thus obviating any throttling of the steam in the receiver. The diagrams on the previous page were taken during an ordinary rolling process and show very clearly how extremely well our engines work.

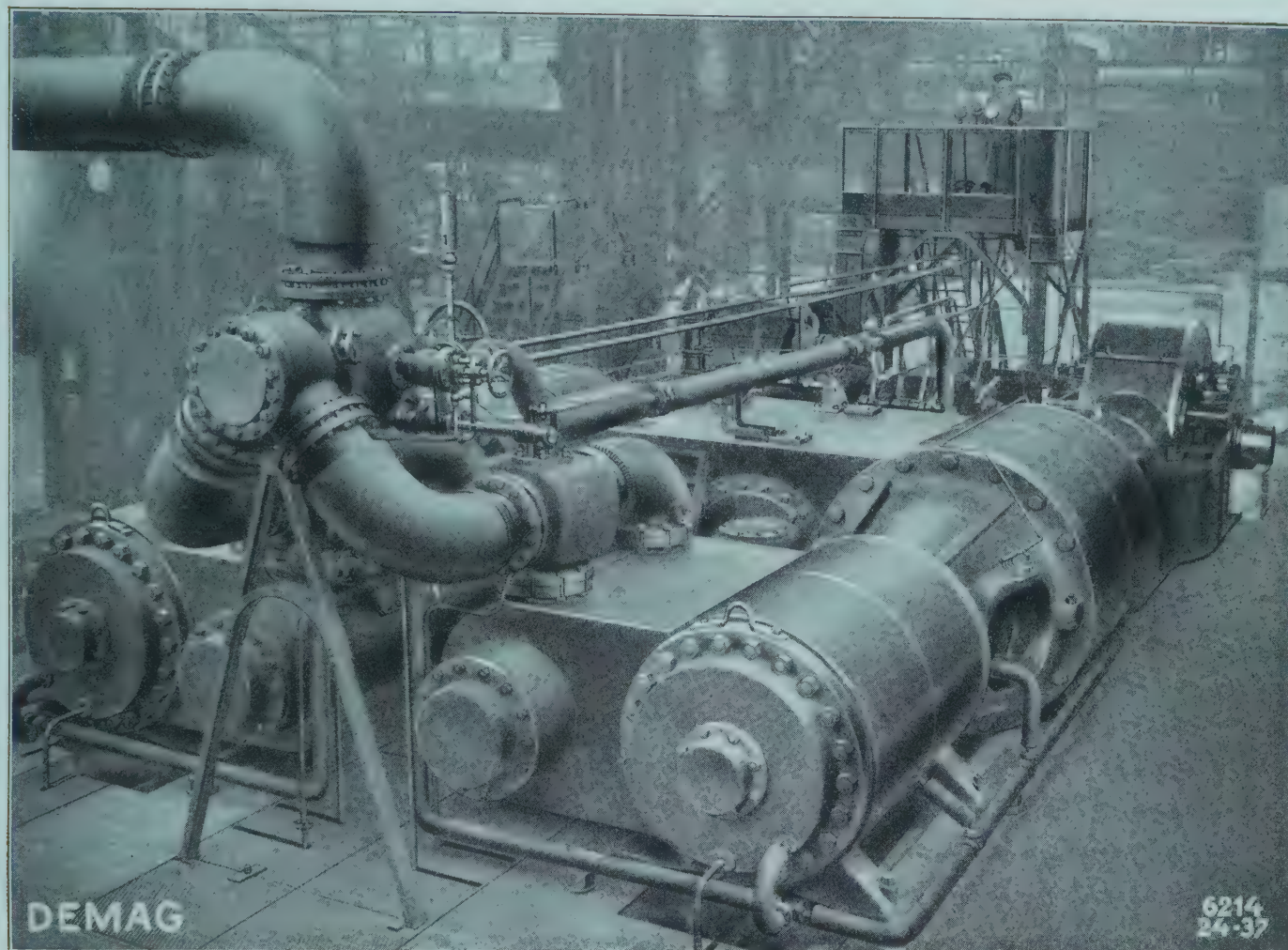




## TWIN TANDEM REVERSING ENGINE DELIVERED FOR BISMARCKHÜTTE, BISMARCKHÜTTE (UPP. SILES.)

**T**his engine drives one of our plate rolling mills with rolls of 1200 mm. in diameter and 4.5 metres long, on which slabs up to a weight of 15 tons are rolled. It is driven by superheated steam at 275° C. and 10 atm. pressure. The pinion housings are built into the foundation frame of the engine.

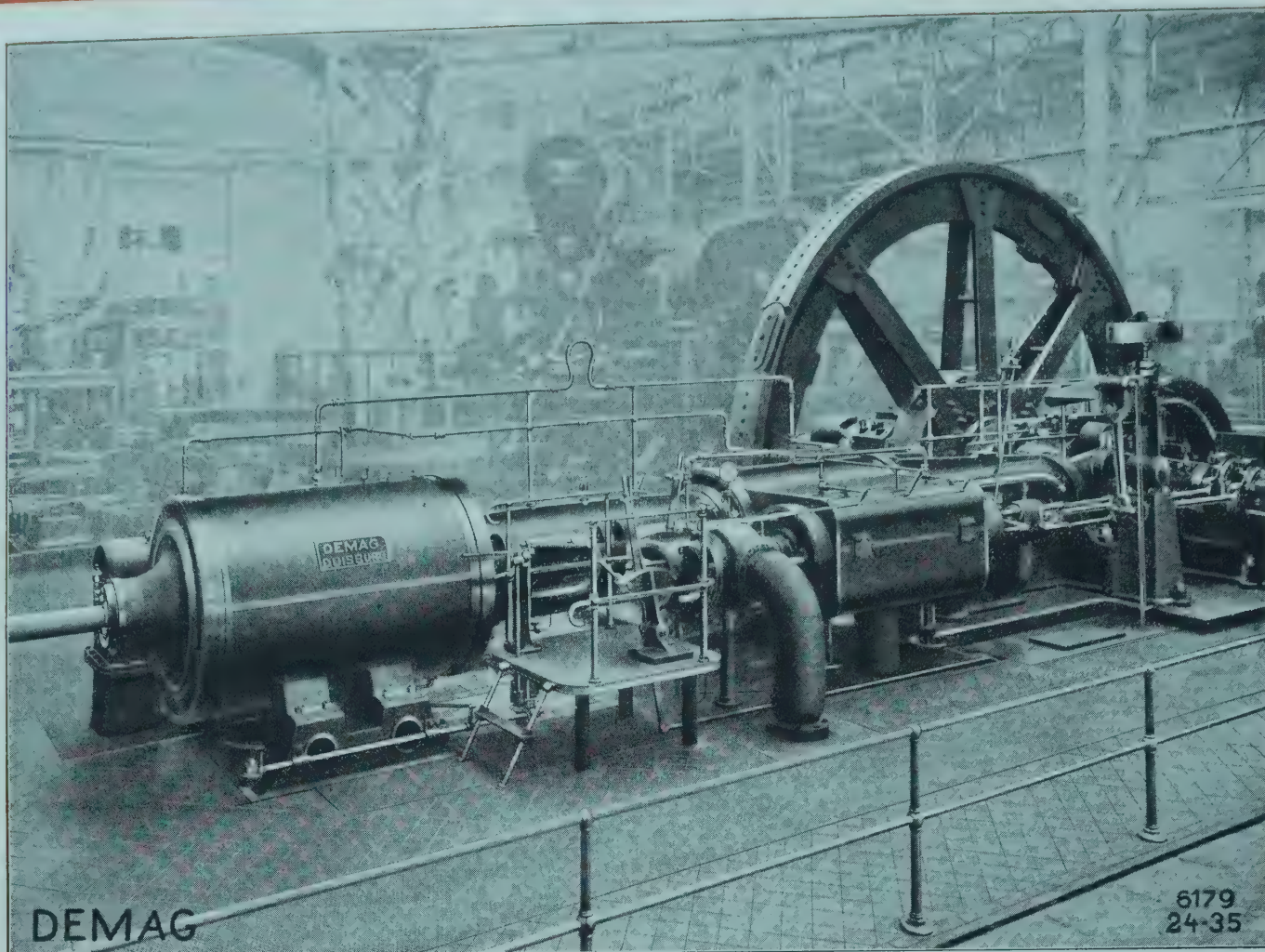




## TWIN TANDEM REVERSING ENGINE LOTHRINGER HÜTTENVEREIN AUMETZ-FRIEDE, KNEUTTINGEN

**T**his engine drives a big mill with rolls of 750 mm. in diameter. The four cylinders have diameters of 1000 mm. and 1600 mm. respectively. The stroke of the piston is 1300 mm. the maximum speed of the engine 200 revs. per min. and the steam pressure 10 atm. The engine works without a fly-wheel and therefore the speed of the rolls can be adapted to the rolling process over the widest range at any time.

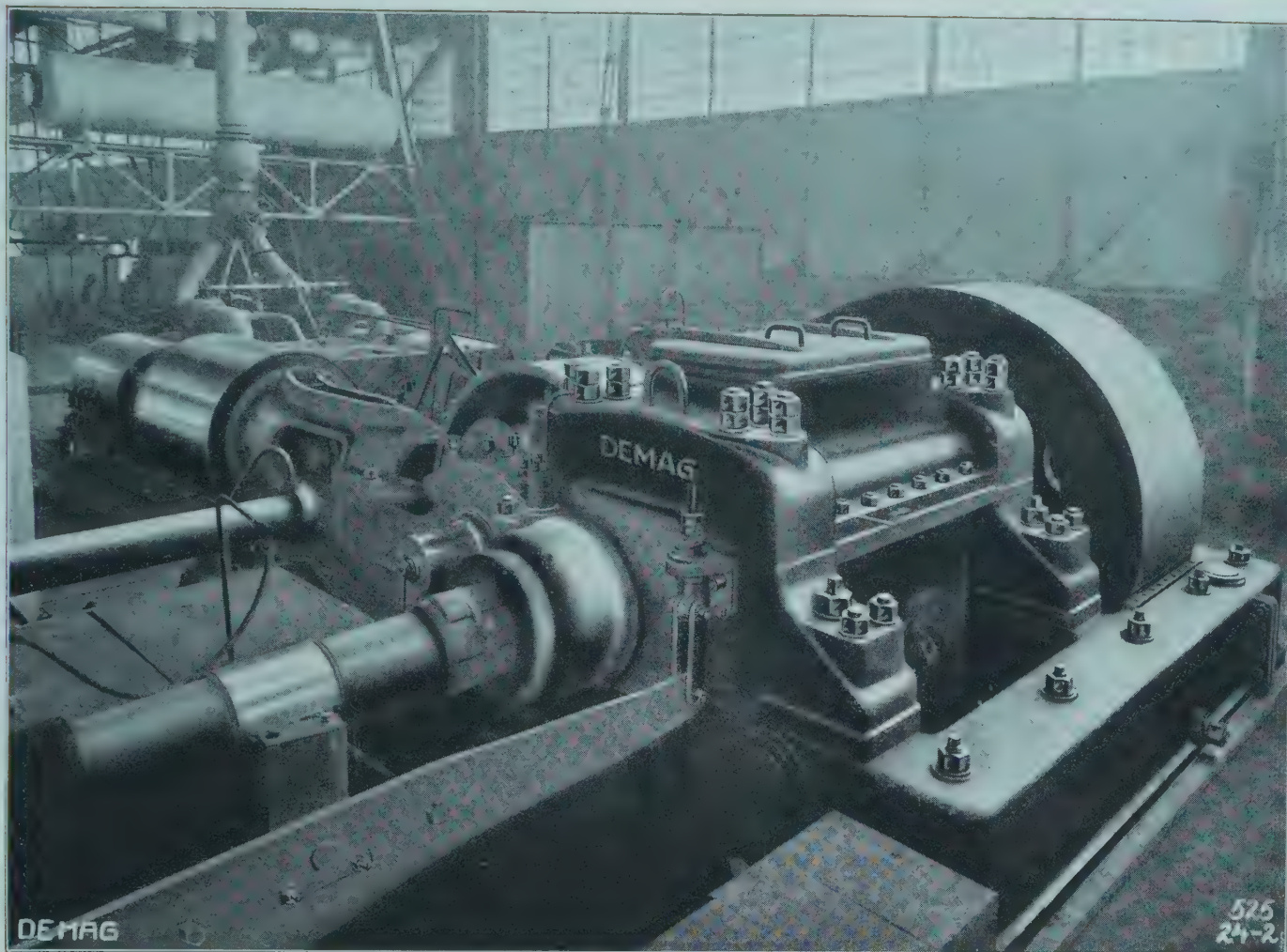




**TANDEM ROLLING MILL ENGINE / DELIVERED FOR  
HASPER EISEN- UND STAHLWERK, HASPE, WESTPHALIA**

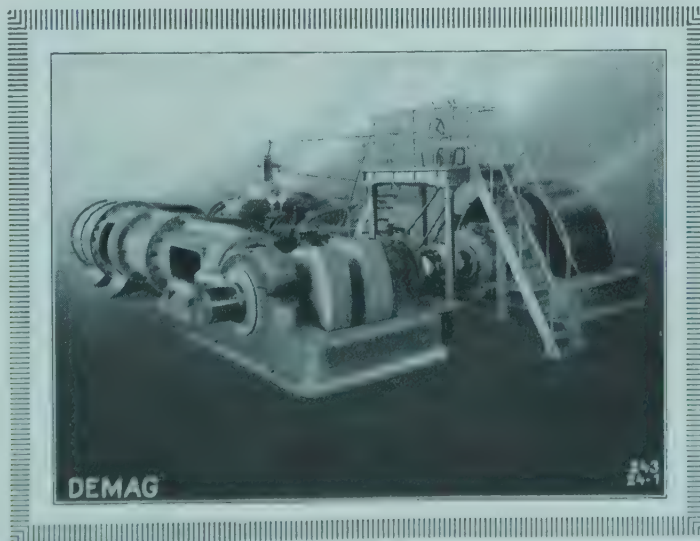
**T**his engine was exhibited at the Trade and Industrial Exhibition, Düsseldorf in the year 1902, together with a universal rolling mill delivered to the Vereinigten Hüttenwerke Burbach-Eich-Düdelingen, Aktien-Ges., Dept. Burbacher Hütte in Burbach. With a working pressure of 10 atm. and a speed of 100 revs. per min. its output is about 1100 H.P., but this can be considerably increased. The fly-wheel is 7.8 metres in diameter and weighs 53.000 kilos.



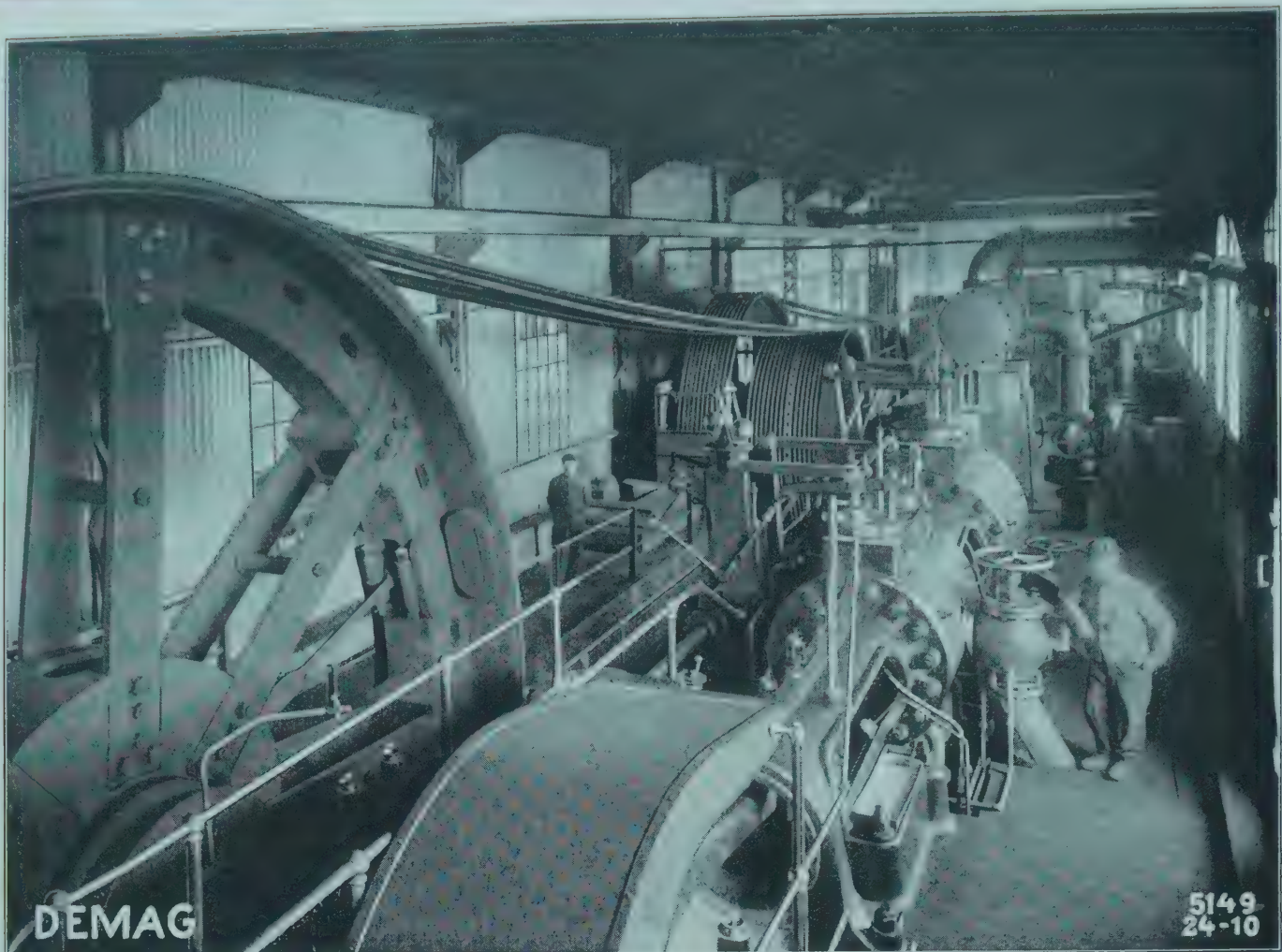


TWIN TANDEM REVERSING ENGINE / GUSSTAHL-  
WERK WITTEN, AKTIENGESELLSCHAFT, WITTEN-RUHR

**A**s in nearly all our reversing rolling mill engines the pinion housings of this engine are built into the foundation frame of the steam engine as part of the same casting, on which it is supported by strong brackets. A number of fitted bolts and shrunk rings secure it against being shifted either  
 ..... sideways or backward and forward. ....

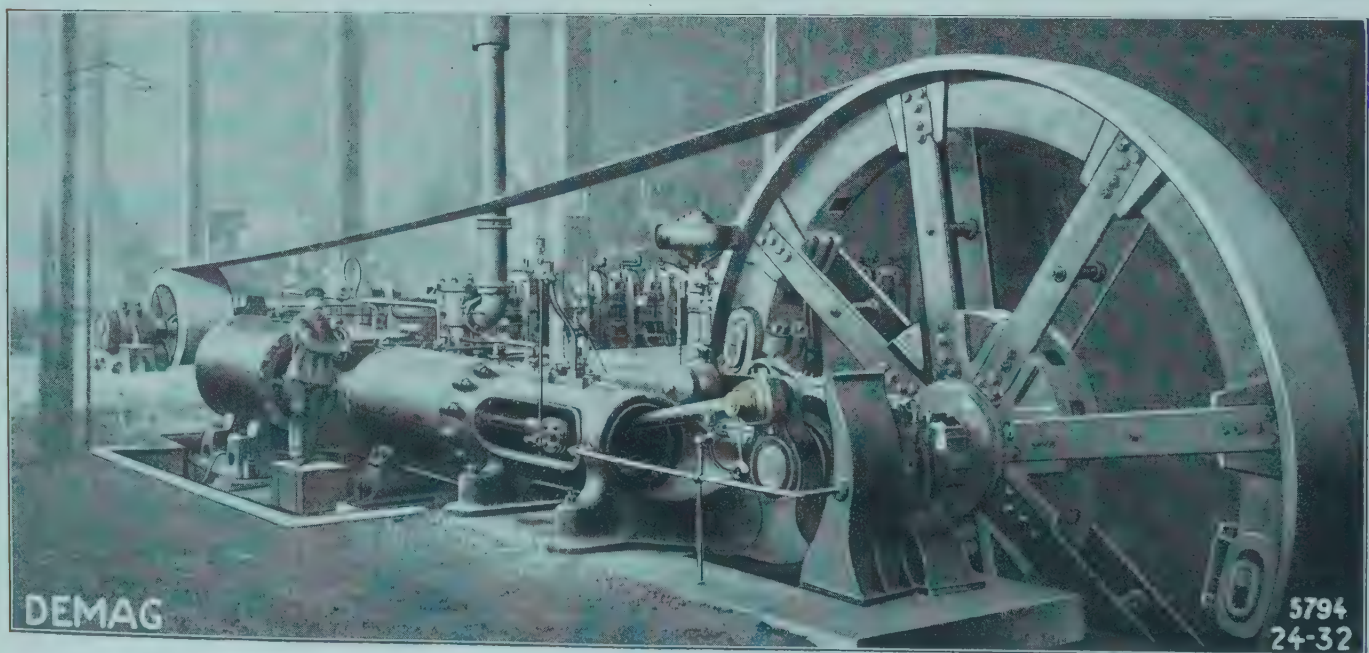




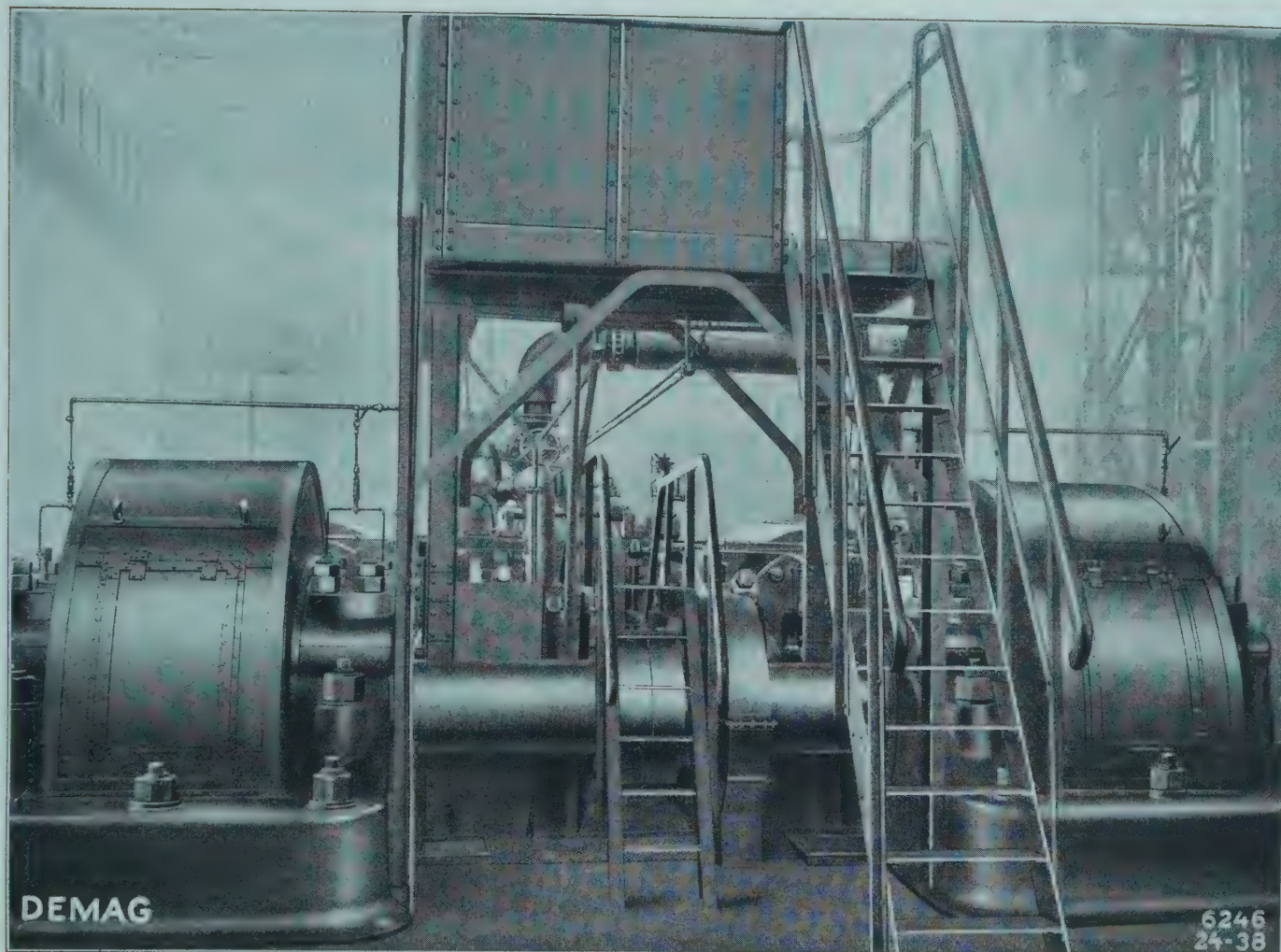


TANDEM ROLLING MILL ENGINE WITH ROPE DRIVE  
DELIVERED TO THE FÜRSTLICH STOLBERG'SCHE  
HÜTTENAMT IN ILSENBURG BEI WERNIGERODE

OLD-FASHIONED TANDEM ROLLING MILL ENGINE DRIVEN BY BELT TRANSMISSION

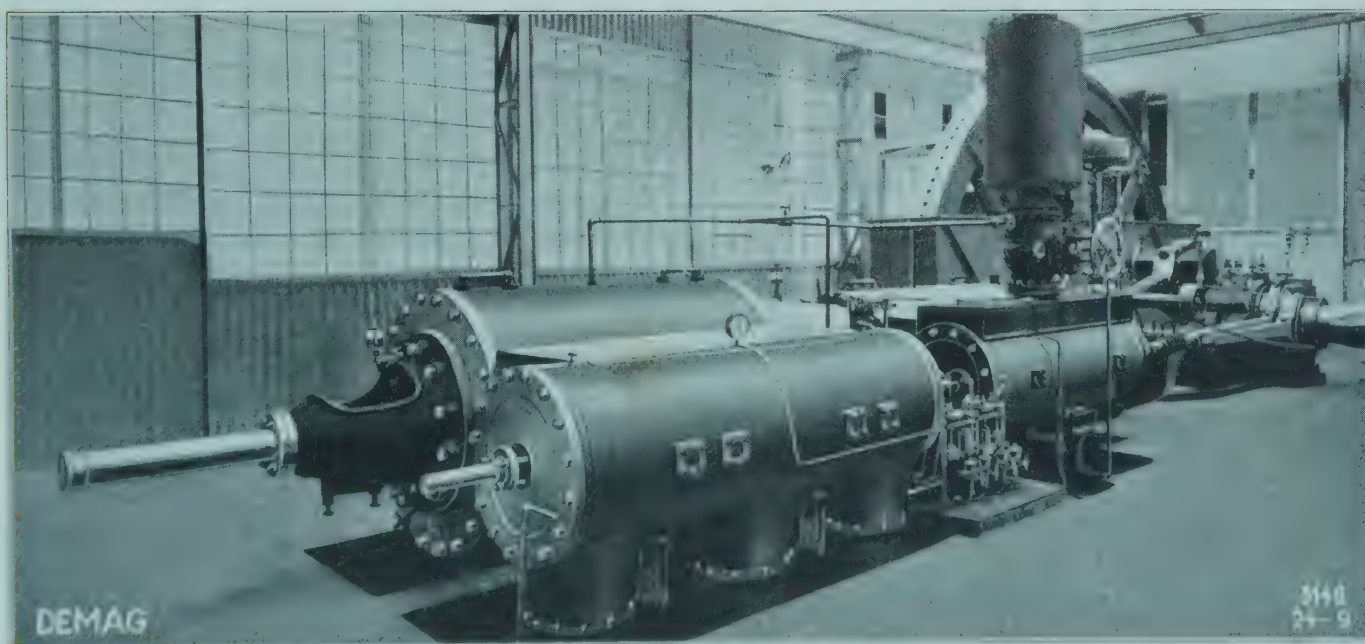




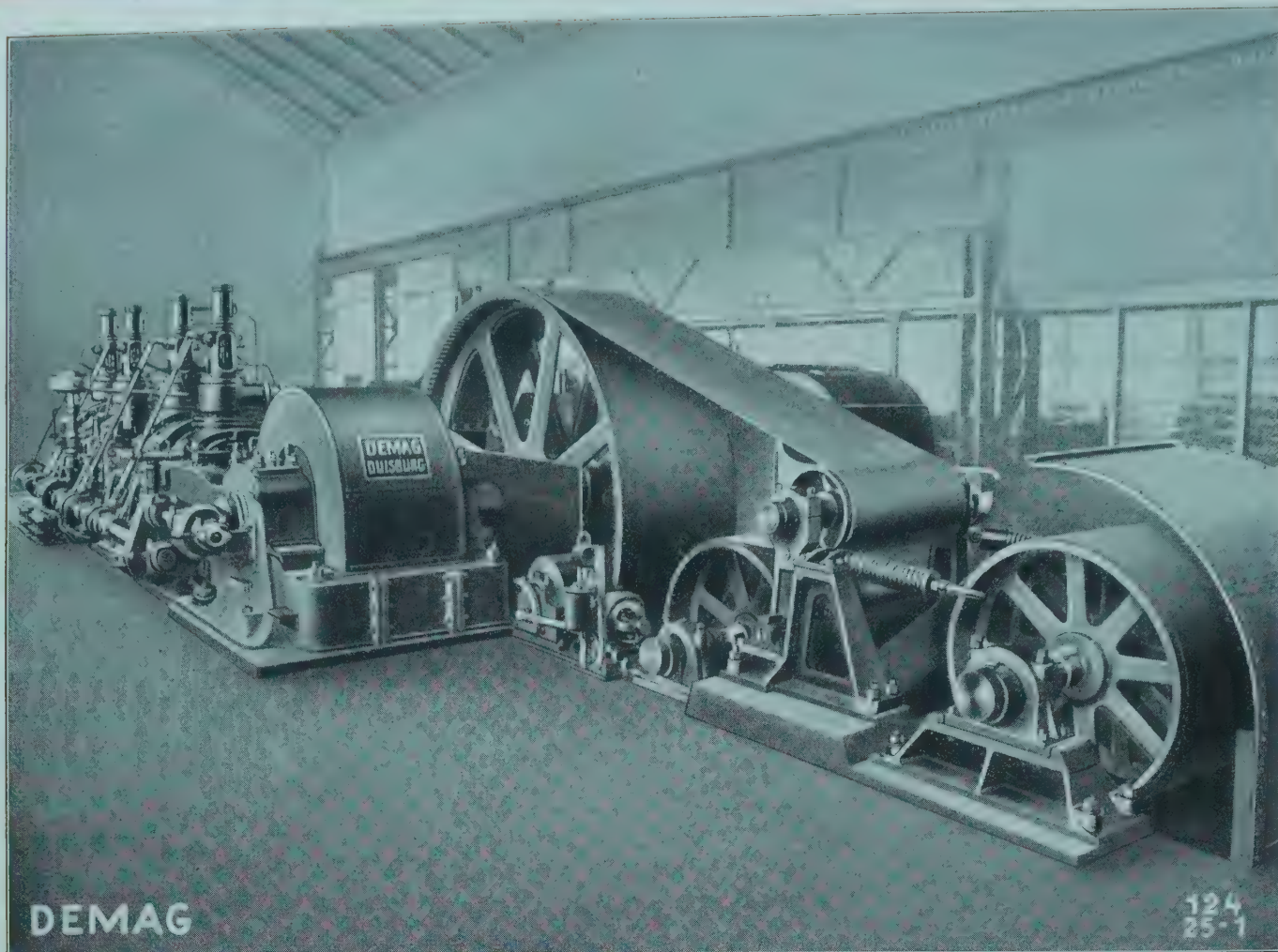


TWIN TANDEM REVERSING ENGINE FOR DRIVING  
A BIG ROLLING MILL / DELIVERED TO THE LOTHRINGER  
HÜTTENVEREIN AUMETZ-FRIEDE, KNEUTTINGEN

OLD FASHIONED TANDEM ROLL. MILL ENGINE COUPL. DIRECT TO THE ROLL. MILL



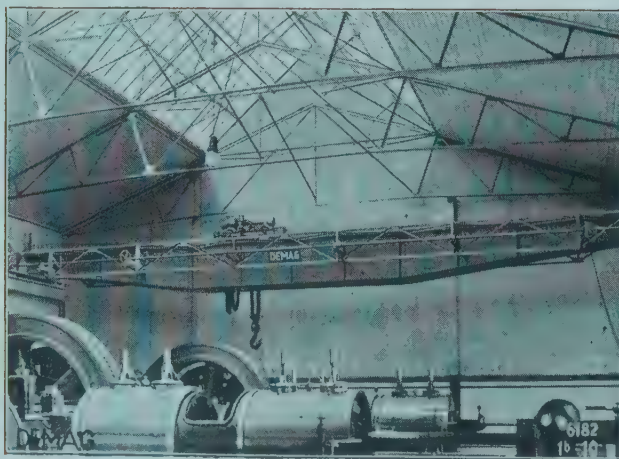




## GAS ENGINE FOR DRIVING A ROLLING MILL RHEINISCHE STAHLWERKE, DUISBURG-MEIDERICH

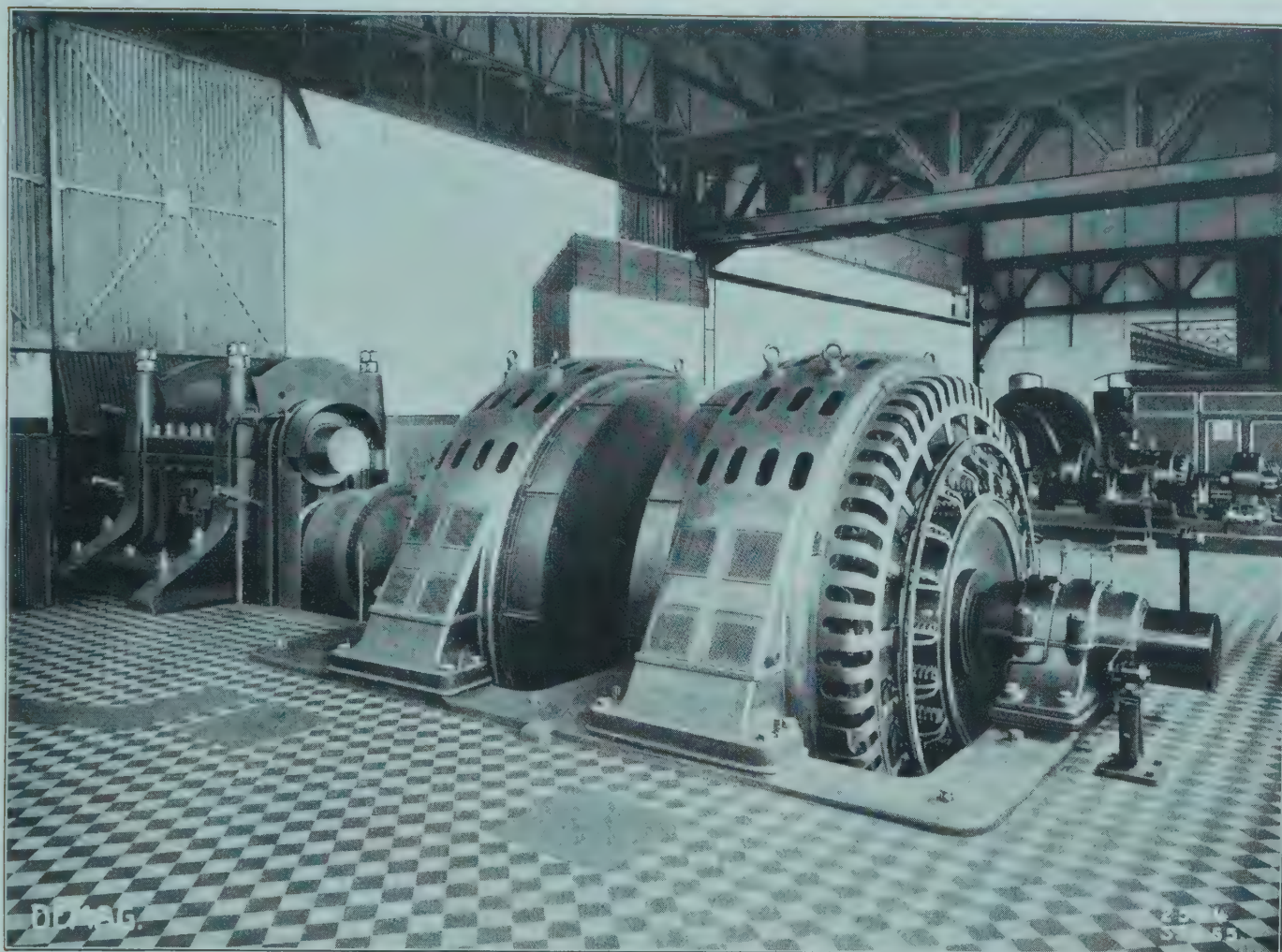
**T**his gas engine, which was delivered by us, was the first big gas engine erected in Germany for driving a rolling mill direct. It has worked perfectly since the very first day it was taken into service, and is still in use.

Standard  
travelling motor  
crane to carry  
20.000 kilos.



Delivered  
for the electric  
power station of  
a rolling mill.

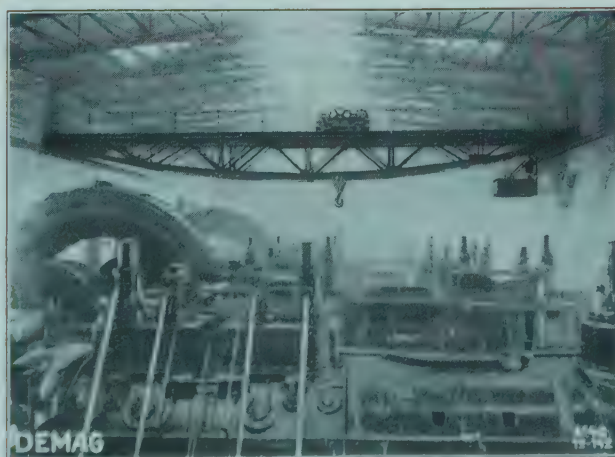




## OBERSCHLESISCHE EISENINDUSTRIE / AKTIENGESELLSCHAFT FÜR BERGBAU- UND HÜTTENBETRIEB, DEPT. JULIENHÜTTE

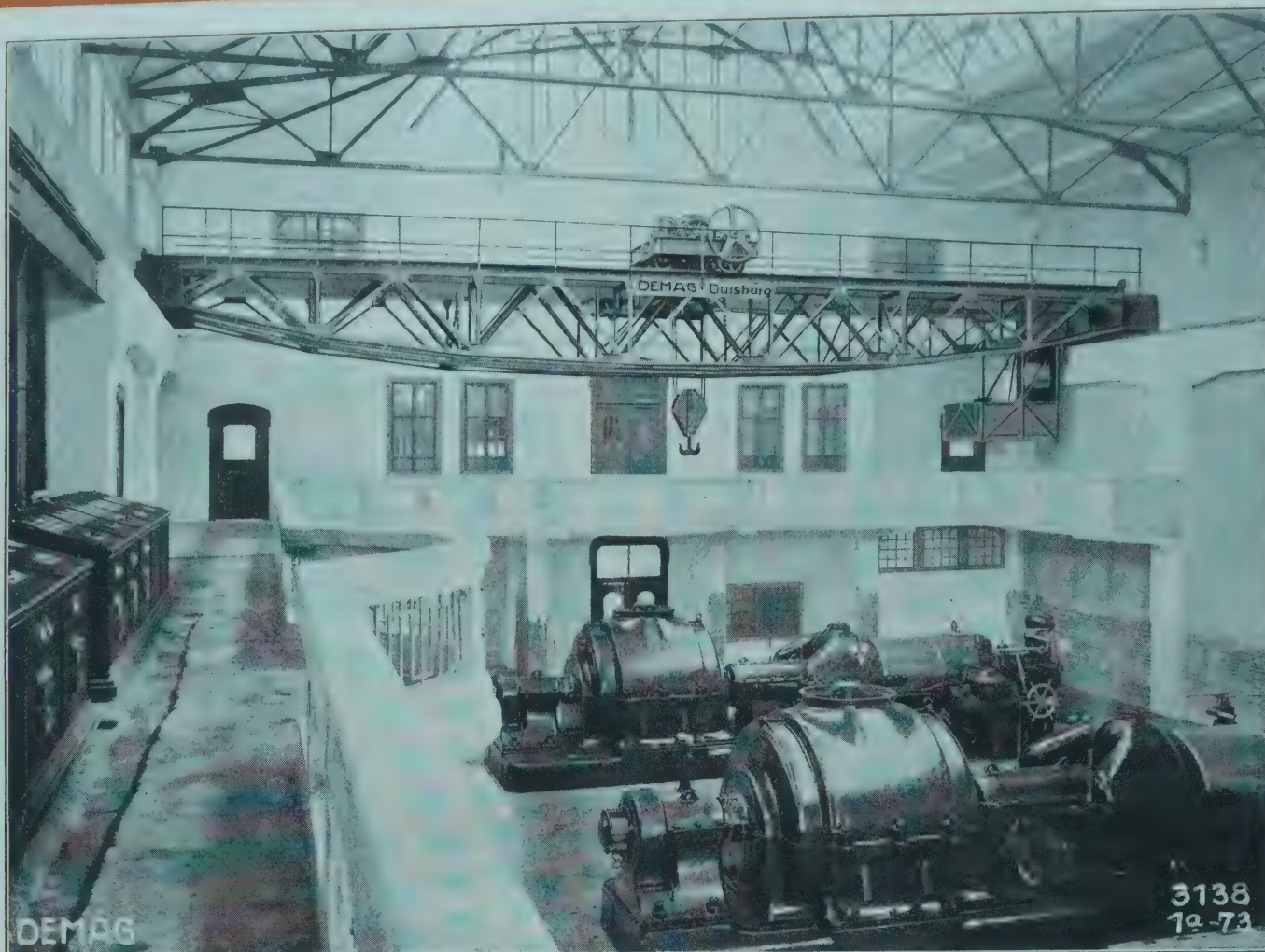
**T**his illustration shows the electric drive of a reversing rolling mill delivered by us, with rolls 1100 mm. in diameter and 2100 mm. length of barrel. The motor is coupled direct to the lower pinion of the reversing mill by means of an Ortmann coupling.

Standard  
electric travelling  
crane to carry  
50.000 kilos.



Delivered for the  
electric power  
station  
of a steel plant.





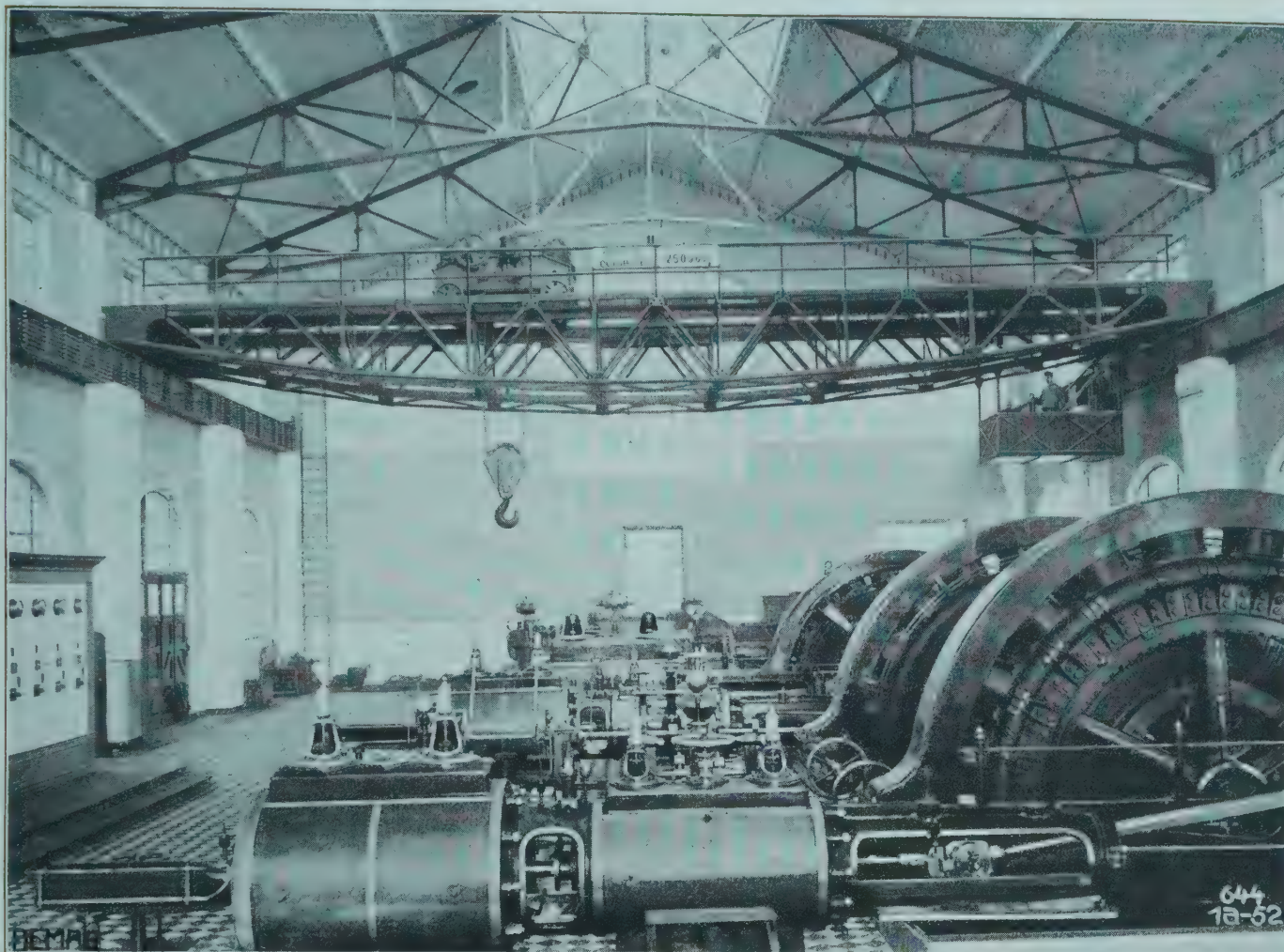
STANDARD ELECTRIC OVERHEAD TRAVELL. CRANE IN A POWER STATION

**I**nstead of hand travelling cranes which in former times were almost exclusively employed in the power stations and engine houses of steel works, electric lifting appliances are now given the preference, as with their assistance the work of repairing and cleaning is done much quicker and far more conveniently. The prime cost of a hand travelling crane is certainly lower, but in consequence of the various advantages offered by an electric crane, including the redu-

cing of the necessary stoppages to a minimum, the higher prime cost of the latter soon makes itself paid.

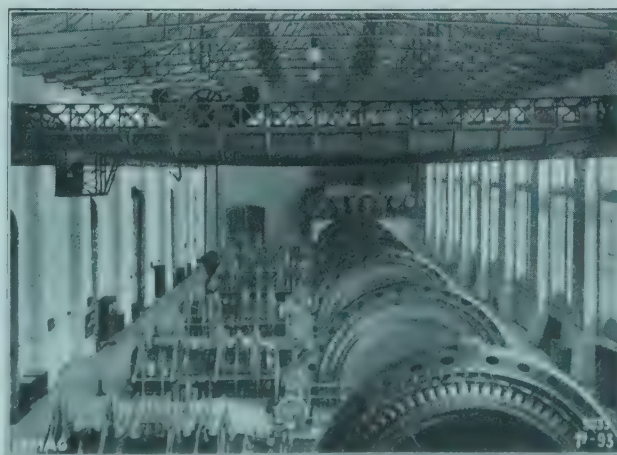




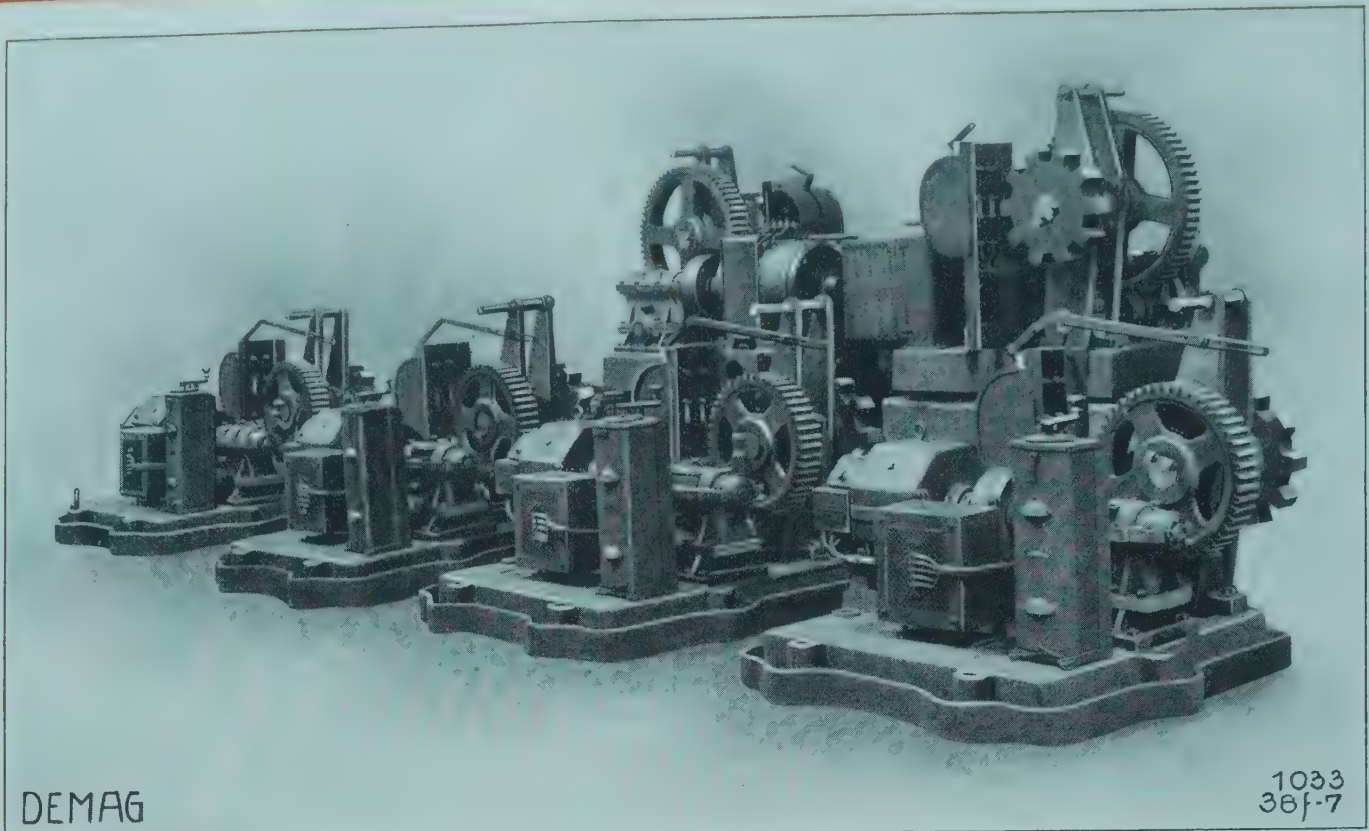


ELECTRIC THREE MOTOR OVERHEAD TRAVELLING CRANE / LIFTING CAPACITY 25000 KILOS AND SPAN 19 METRES, IN THE ENGINE HOUSE AT THE WESTFÄLISCHEN STAHLWERKE, AKTIENGESELLSCHAFT IN BOCHUM

**T**he designing of a crane, the most suitable arrangement and the dimensions of the various parts depend on the circumstances under which the crane has to work. As the leading firm for cranes our large experience enables us to adapt our constructions to any working conditions both as regards suitability and :: profitableness. ::





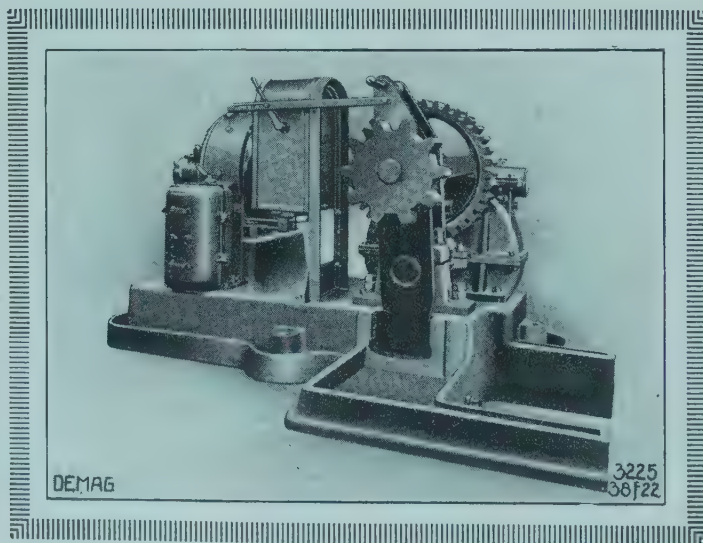


DEMAG

1033  
38f-7

## ELECTRIC STARTING DEVICE

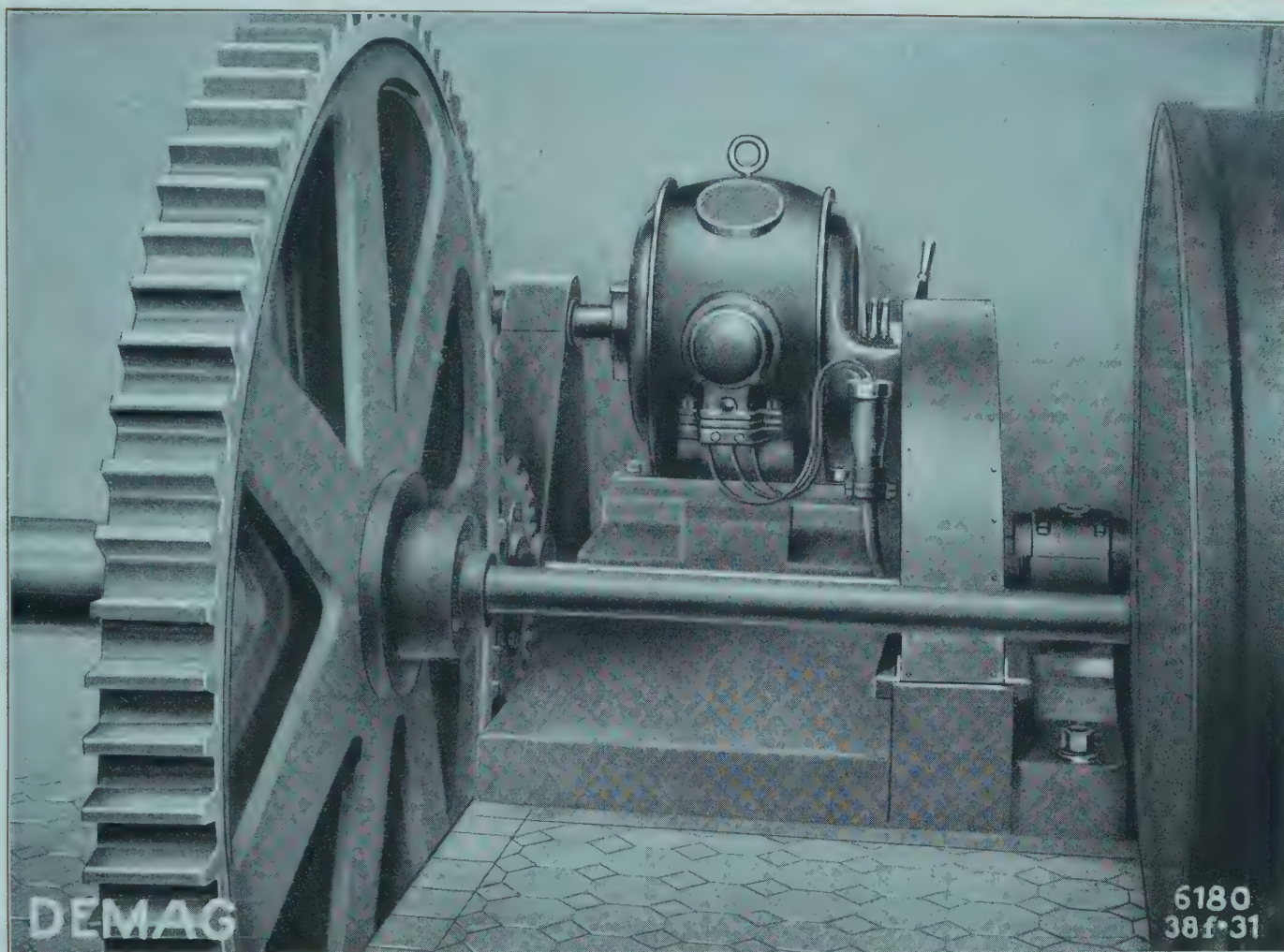
**I**n order to bring steam engines to the starting position or to give the fly-wheel of other driving engines a moderate initial velocity as is necessary, for example, when starting big gas engines or throwing the claw coupling of rolling mills into gear, electric starting devices may be used to good advantage. The latter are fitted with an automatic disconnecting gear in which the driver, which drives the toothed fly-wheel, is disconnected as soon as the fly-wheel of the engine driven has assumed a fairly high peripheral speed.



DEMAG

3225  
38f22





ELECTRIC STARTING DEVICE / DELIVERED TO THE  
TUBE ROLLING MILL OF CAPITO & KLEIN, AKTIEN-  
GESELLSCHAFT, BENRATH nr. DUSSELDORF

# OLD-FASHIONED CONSTRUCTION OF A STARTING DEVICE FOR HAND DRIVE





## THE MACHINE HALL IN THE ROLLING MILL



WORKING AT A BIG ROLLING MILL FLY-  
WHEEL BY MEANS OF PORTABLE  
DRILLING MACHINES



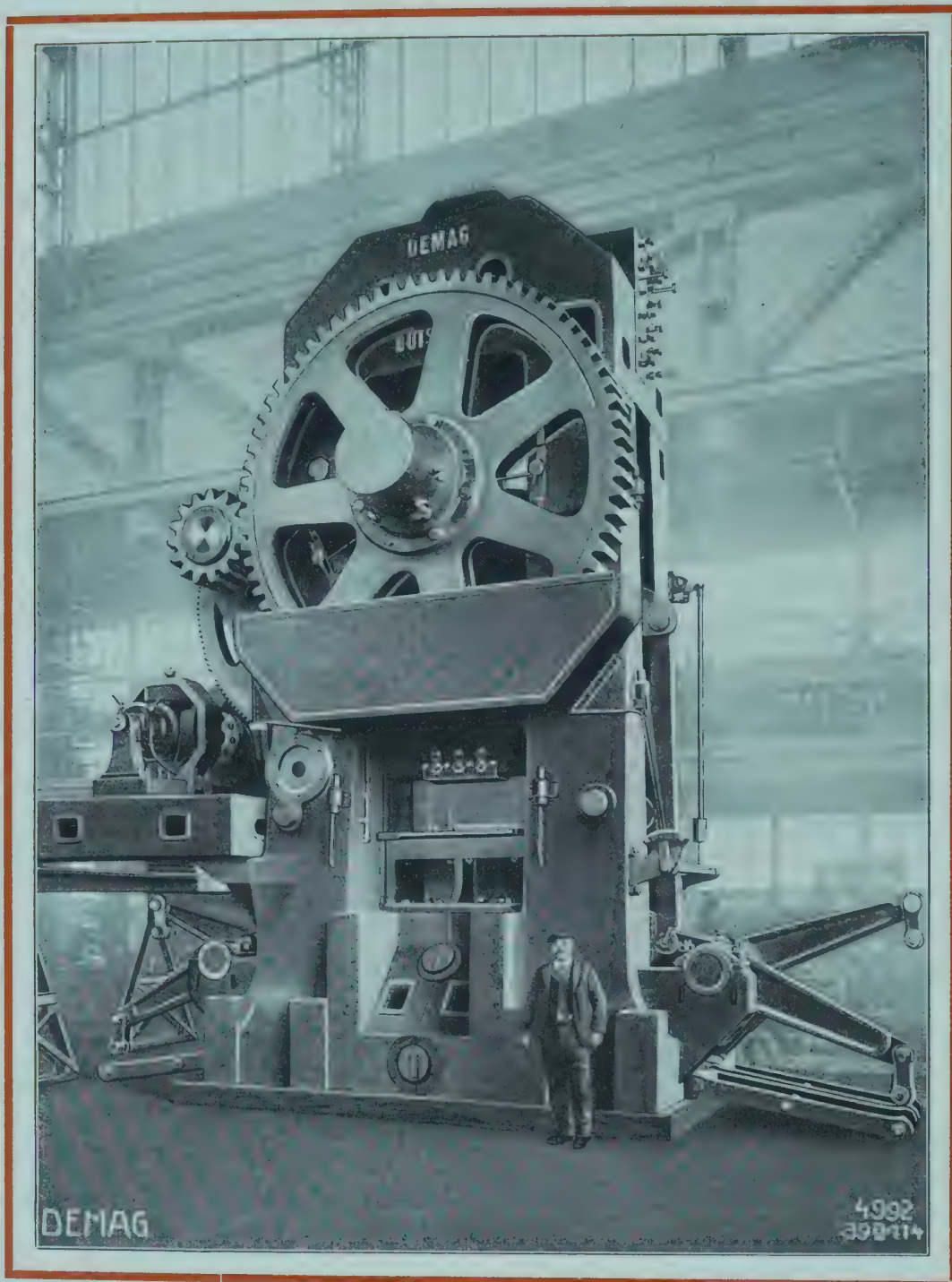
# ELECTRIC AND HYDRAULIC SHEARS

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**A**fter having been rolled into a bar, the ingot is led to the finishing mill in suitable lengths, if there are such mills in connection with the blooming mill, or it is suitably cooled and loaded direct. The rolled bloom is cut to the desired lengths by electric or hydraulic shears whilst still warm. In the following pages some of these patent Demag shears are illustrated with the measuring stops frequently used in connection with them. The latter enable the length of the bloom which is to be cut off by the shears to be adjusted with the greatest possible speed and accuracy. These measuring stops are also worked by electricity or by hydraulic power. In rolling mills with a small output they are still adjusted by hand in many cases. Generally speaking, electric shears have of late been preferred for cutting the blocks, as they possess considerable advantages over the hydraulic shears formerly in use. It is true that there were a few types of electric shears already in use, but they did not satisfy the requirements. We succeeded in designing a new type of electric shears which satisfies all requirements as regards simplicity and safety of working. On the following pages we give a few illustrations of various machines of this construction which have proved absolutely satisfactory in every respect.



**E**lectric underneath cutting shears with movable upper blade, System Demag. Three of these shears have been delivered to the Lothringer Hüttenverein, Aumetz-Friede, Kneuttingen.



**T**his shearing machine is intended for cutting hot ingots up to a maximum cross-section of  $400 \times 400$  mm., and the stroke of the shear blade is fixed to 500 mm. accordingly. These shears are patented in most of the civilized countries.

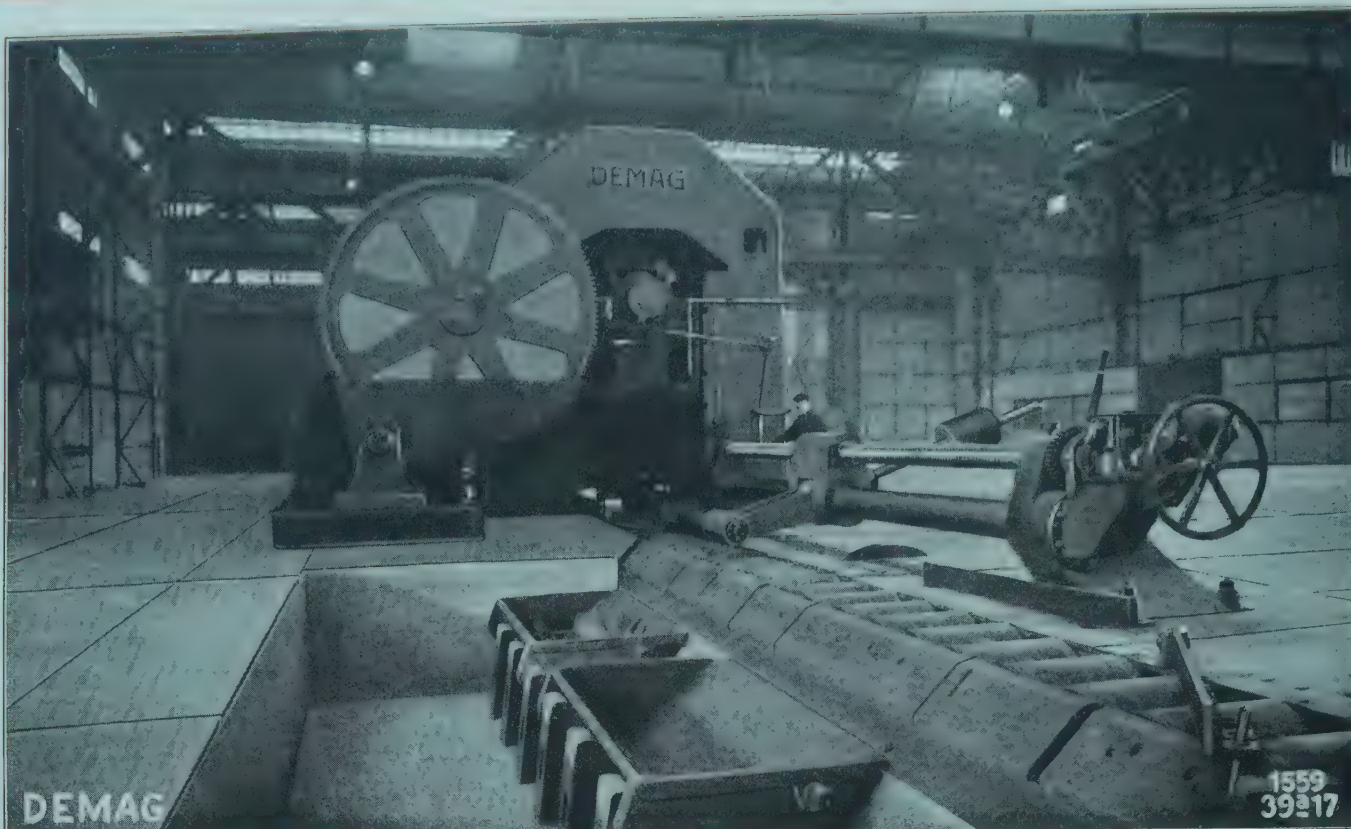




TWO ELECTRICALLY DRIVEN SHEARS – DEMAG PATENT –  
DELIVERED TO THE LOTHRINGER HÜTTENVEREIN  
AUMETZ-FRIEDE, KNEUTTINGEN (LOTHRINGEN)

**T**he larger of the two shears is capable of cutting blooms up to 400 mm. square, the smaller ones blooms up to 200 mm. square. The stroke of the shear blade is 500 and 280 mm. respectively. The shears work as follows: – First the upper blade gets hold of the bloom and keeps it down to its spot, whereupon the lower blade cuts the bloom from underneath. The cut is smooth and at rightangles to the axis of the bloom. The shears are thrown in and out of gear by automatic claw couplings. As a safeguard against breakage two cutouts are built in which snap when the machine is dangerously overloaded, and can very easily be renewed. The fly-wheel is thereby separated from the rest of the gearing, so that the power it exerts is not dangerous. A measuring stop for a maximum block length of 6 metres is arranged behind the large shears, whereas a measuring stop for 2.5 metres is arranged behind the small ones. In the measuring stop for the small machine the stop is moved by a hand wheel and spindle, and lowered by means of a hand lever. The processes of shifting, lifting and lowering the stop of the large shearing machine are each effected by a separate motor.

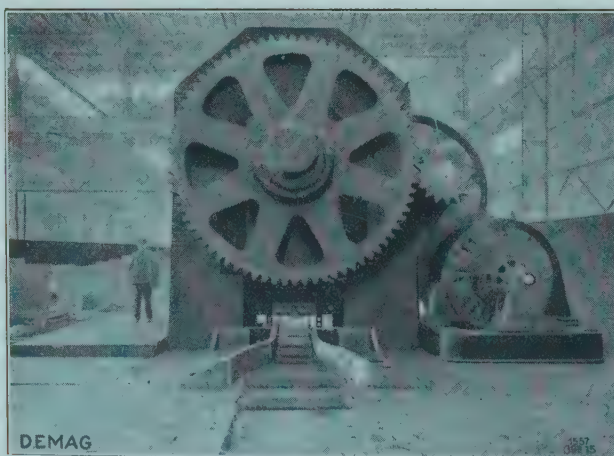




ELECTRICALLY DRIVEN SHEARS / DELIVERED TO A  
LARGE METALLURGICAL PLANT IN RHENISH WESTPHALIA

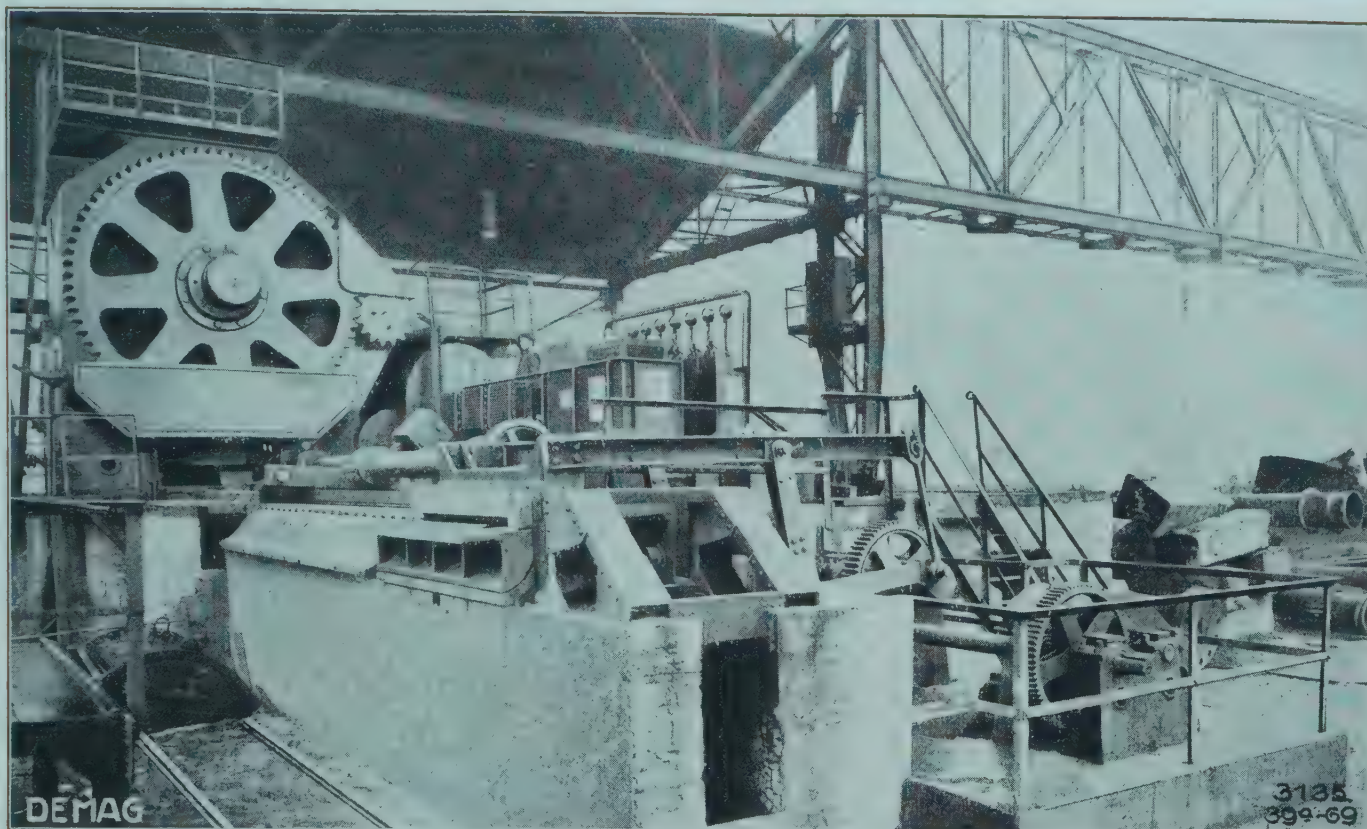
**T**hese shears were exhibited at the World's Fair in Brussels in the year 1910, and are capable of cutting blooms of  $400 \times 400$  mm. cross-section. It can exert a cutting pressure of about 1600000 kilos. The shear blade has a stroke of 500 mm. It was thought that 7 strokes per minute would be sufficient. The motor has an output of 280 H.P., which suffices to enable about 4 cuts per min. for the ordinary temperature of the hot bloom. The machine has a total height of about 7.7 metres, 2.4 metres of which lie below the floor level. At the floor level the shearing machine has a width of 6.5 metres. Total weight of the machine about: 195000 kilos.

Electrically driven  
shears for blooms  
400 mm. square.



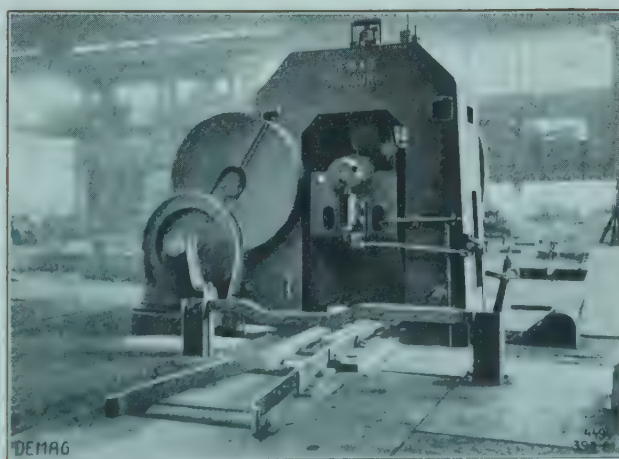
Delivered to a large  
metallurgical plant in  
Rhenish Westphalia.





ELECTRICALLY DRIVEN SHEARS – DEMAG PATENT – DELIVERED TO THE RÖCHLINGSCH EISEN- UND STAHLWERKE, G. M. B. H., VÖLKLINGEN

**T**hese shears serve for cutting blooms up to 400 mm. square and are similar in design to those described on the foregoing page. Behind the machine is attached a measuring stop for 6 metre lengths. The weights of the movable parts of the shears are counterbalanced by counterweights situated beneath the floor. The roller gears lead quite close up to the lower shear blade so as to render the transport of the material through the shears as reliable as possible. Since the patent was granted 17 shears of the design shown in the illustration have been delivered; the largest of these machines is capable of cutting blooms up to 450 mm. square.

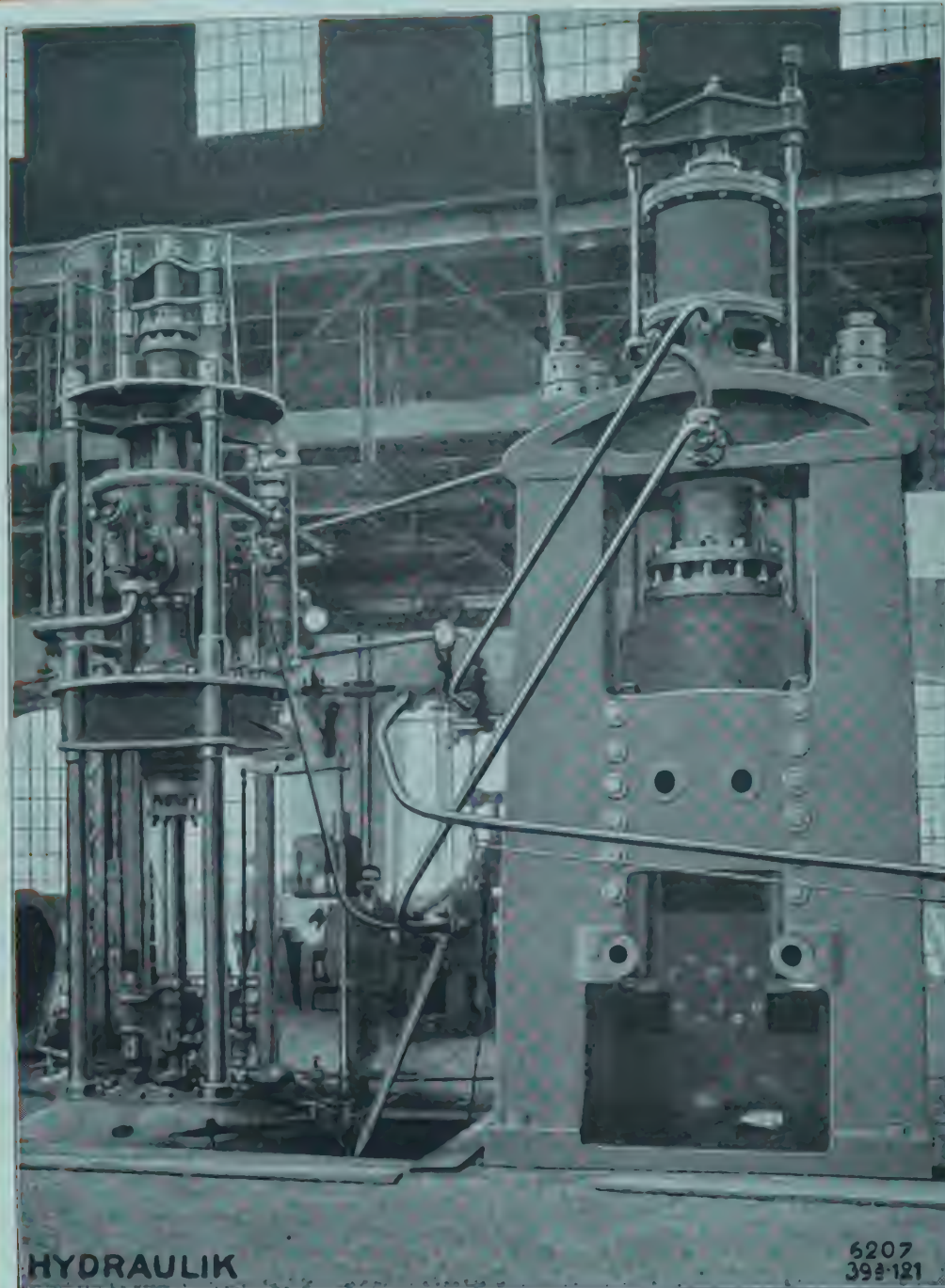


Electrically driven shears for medium cross-sections.

Delivered to the Peiner Walzwerk, Akt.-Gesellsch., Peine.



## HYDRAULICALLY DRIVEN SHEARS

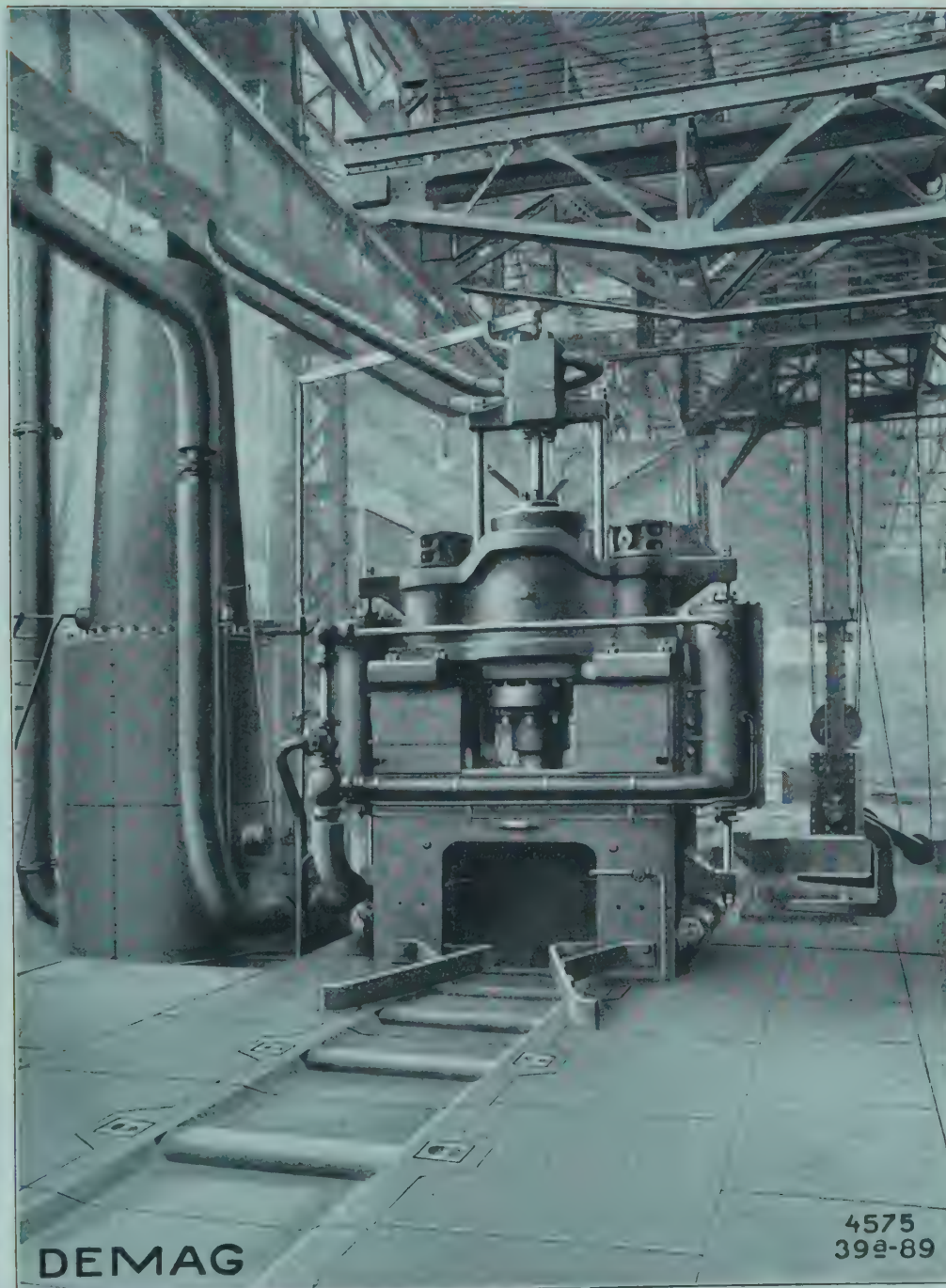


### FOR BLOOMS 300 MILLIMETRES SQUARE

The hydraulic pressure of 300 atm. is produced by an automatic double-acting hydraulic pressure transmitter for which ..... a steam pressure of six atmospheres is necessary. ....



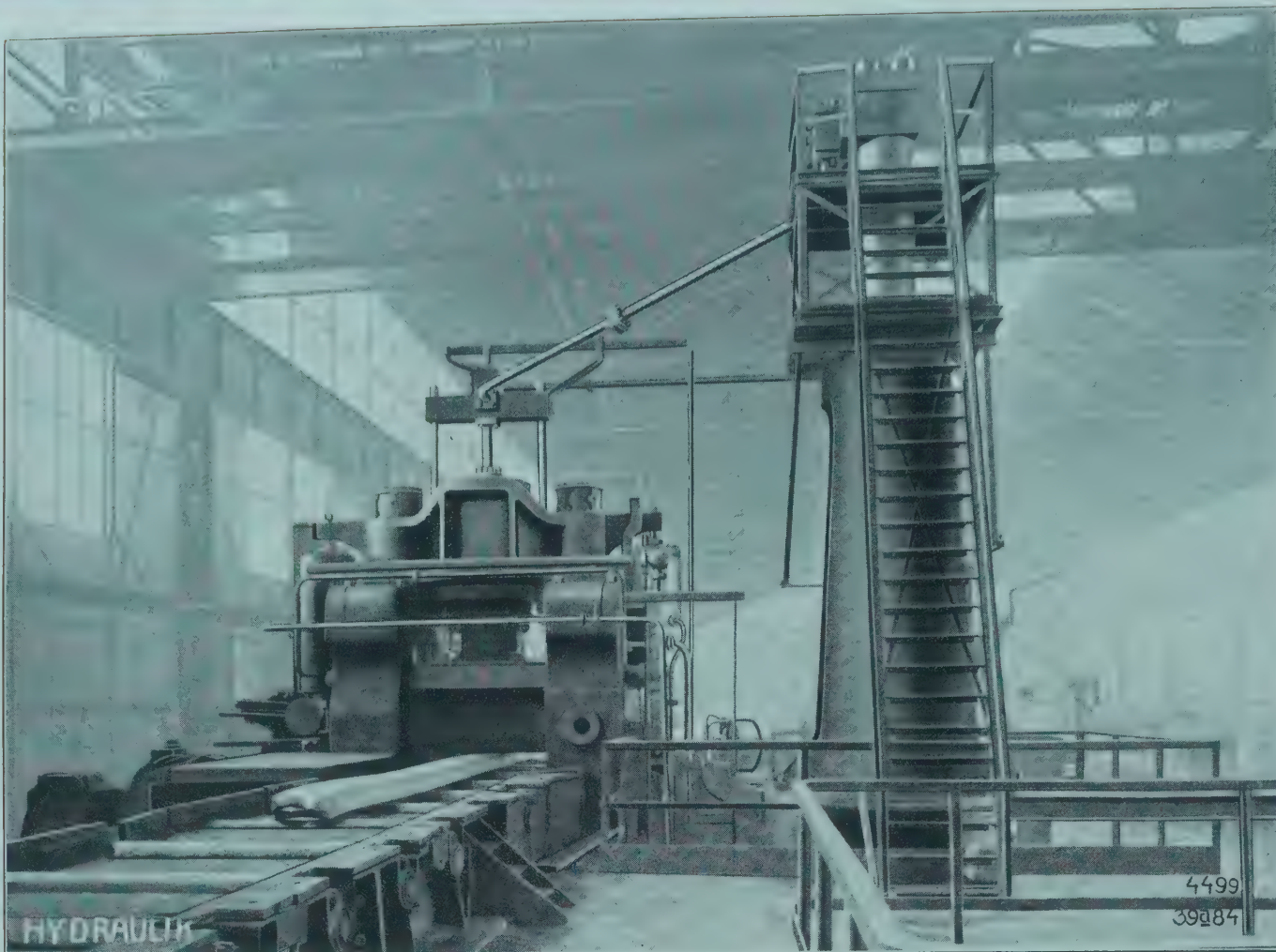
## HYDRAULIC SHEARING MACHINE



FOR BLOOMS 300 MILLIMETRES SQUARE

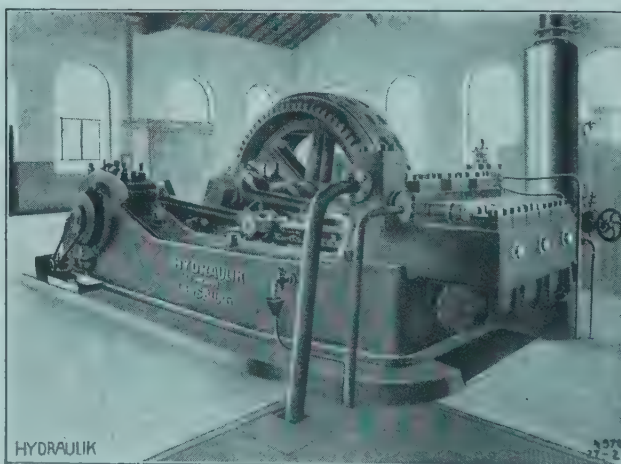
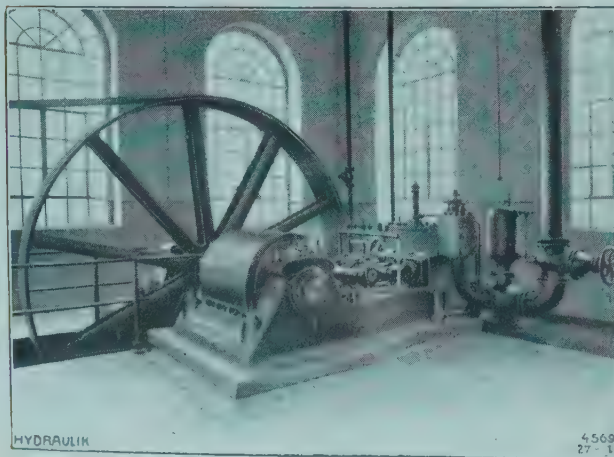
The upper and lower shear blades of this steam hydraulic shearing machine are both movable. The crane shown in the illustration has a special bucket tipping device and transports the buckets filled with cut bars to the loading place.



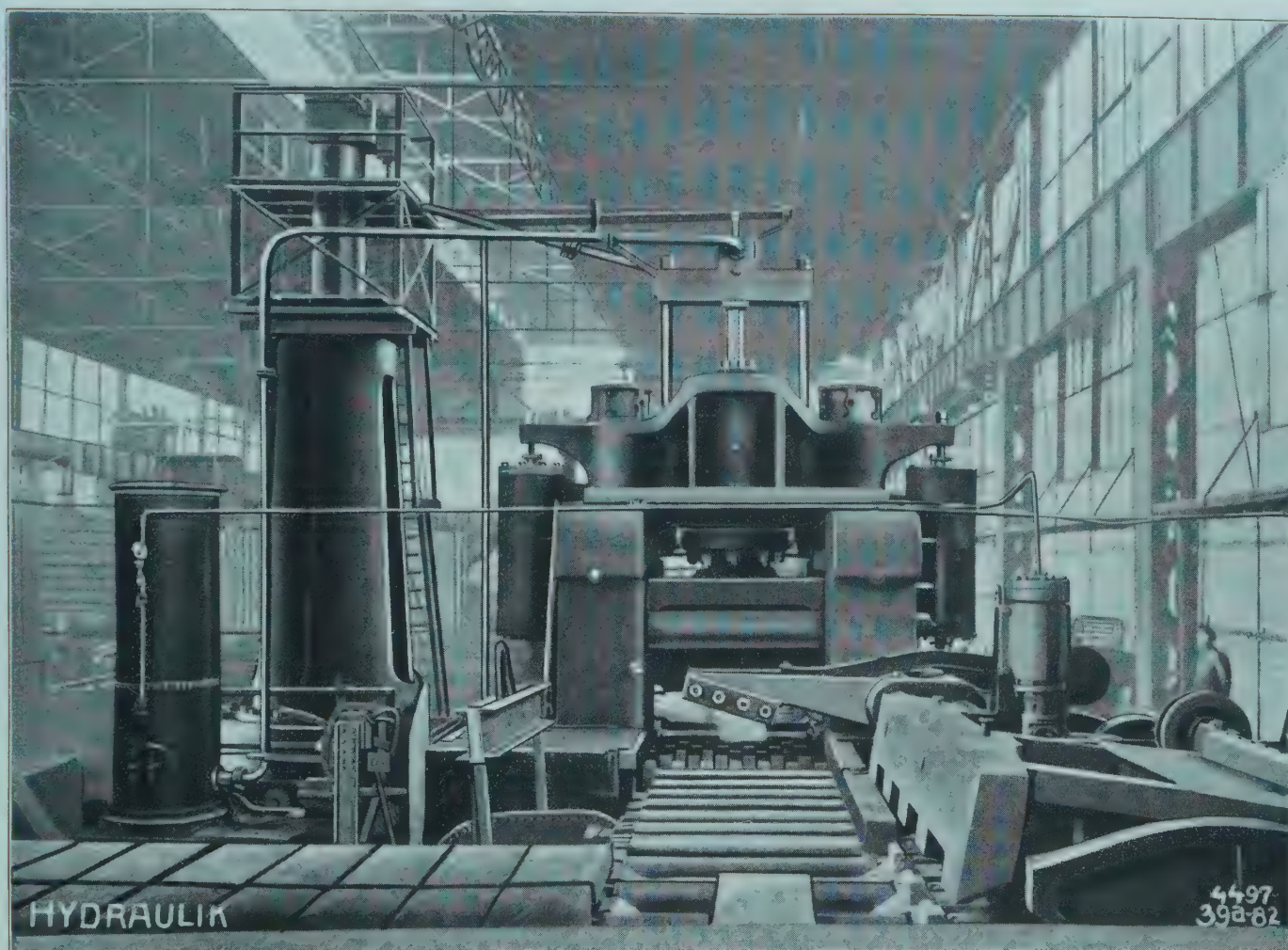


STEAM HYDRAULIC SHEARING MACHINE WITH MOVABLE UPPER AND LOWER BLADES (FRONT VIEW) DELIVERED FOR THE RHEINISCHE STAHLWERKE, AKTIEN-GESELLSCHAFT, DUISBURG-MEIDERICH

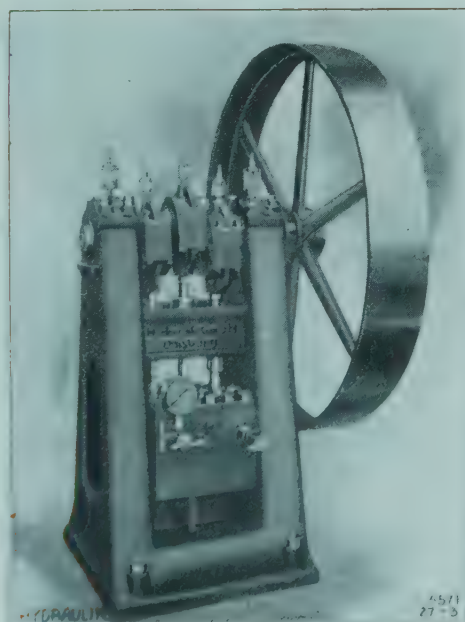
Heavy horizontal hydraulic three plunger pressure pump for belt transmission or direct motor drive, for any output and any pressure.







STEAM HYDRAULIC SHEARING MACHINE WITH MOVABLE UPPER AND LOWER SHEAR BLADES FOR BLOOMS UP TO  $500 \times 500$  OR FOR SLABS UP TO  $1250 \times 200$  mm. (BACK VIEW) / DELIVERED FOR THE RHEINISCHE STAHLWERKE, A.-G., DUISBURG-MEIDERICH



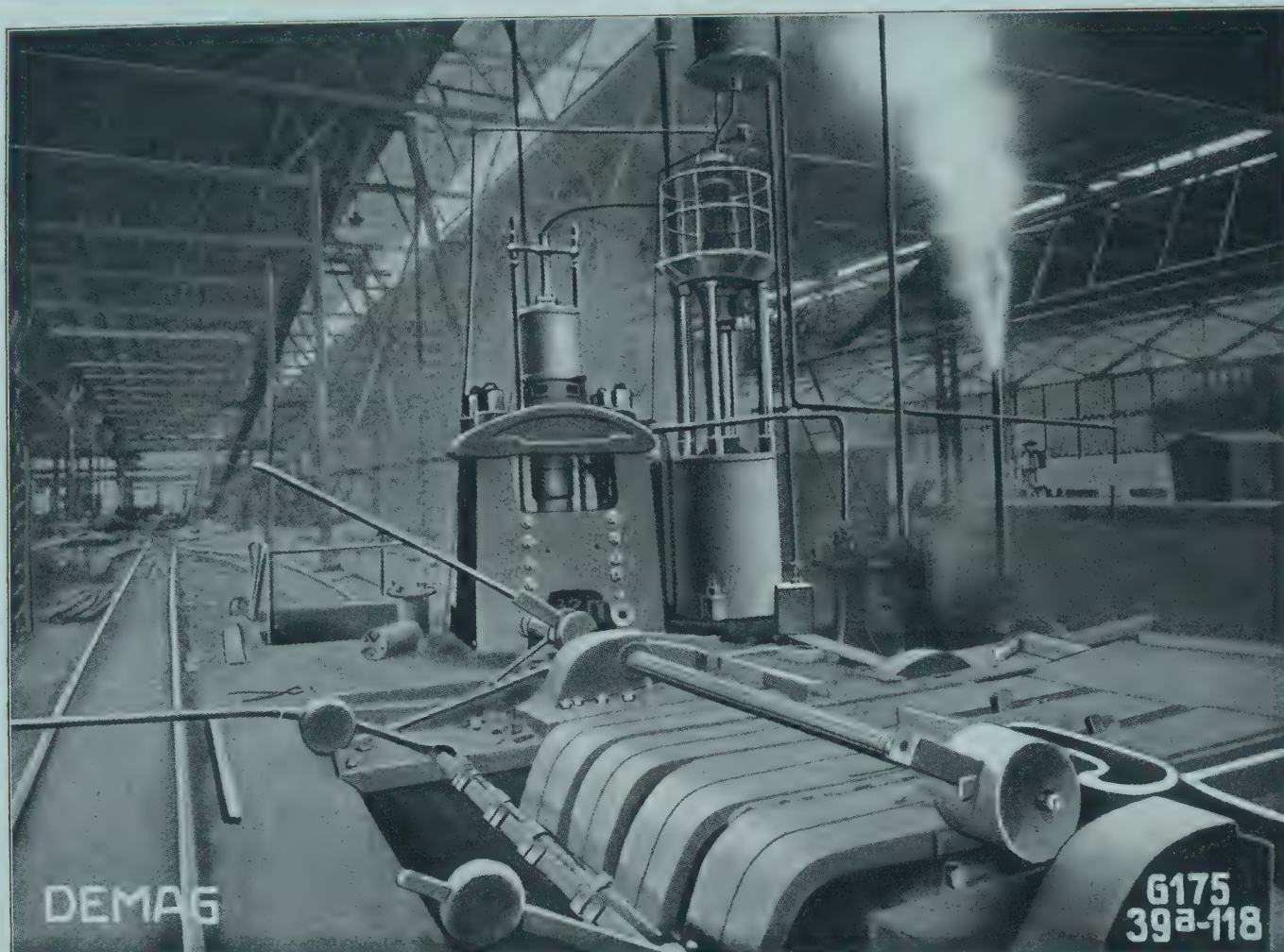
**VERTICAL  
THREE PLUNGER  
PRESSURE PUMP**  
for powers up to 100 H. P. These pumps have been one of our specialties for years. They combine compact and strong design with easy accessibility of all parts.

**WEIGHT  
ACCUMULATOR**  
weighted by ores or cast iron plates.





The hydraulic shearing machine illustrated on this page has a movable upper blade and steam reverser and cuts at the same time two billets of a cross-section of  $90 \times 90$  mm.



The pressure water is produced by the steam power gear standing alongside the shearing machine. To the front of the machine is attached a hydraulic device for holding down the bloom.

The measuring stop behind the machine is served by hand by means of a lever and wheel.

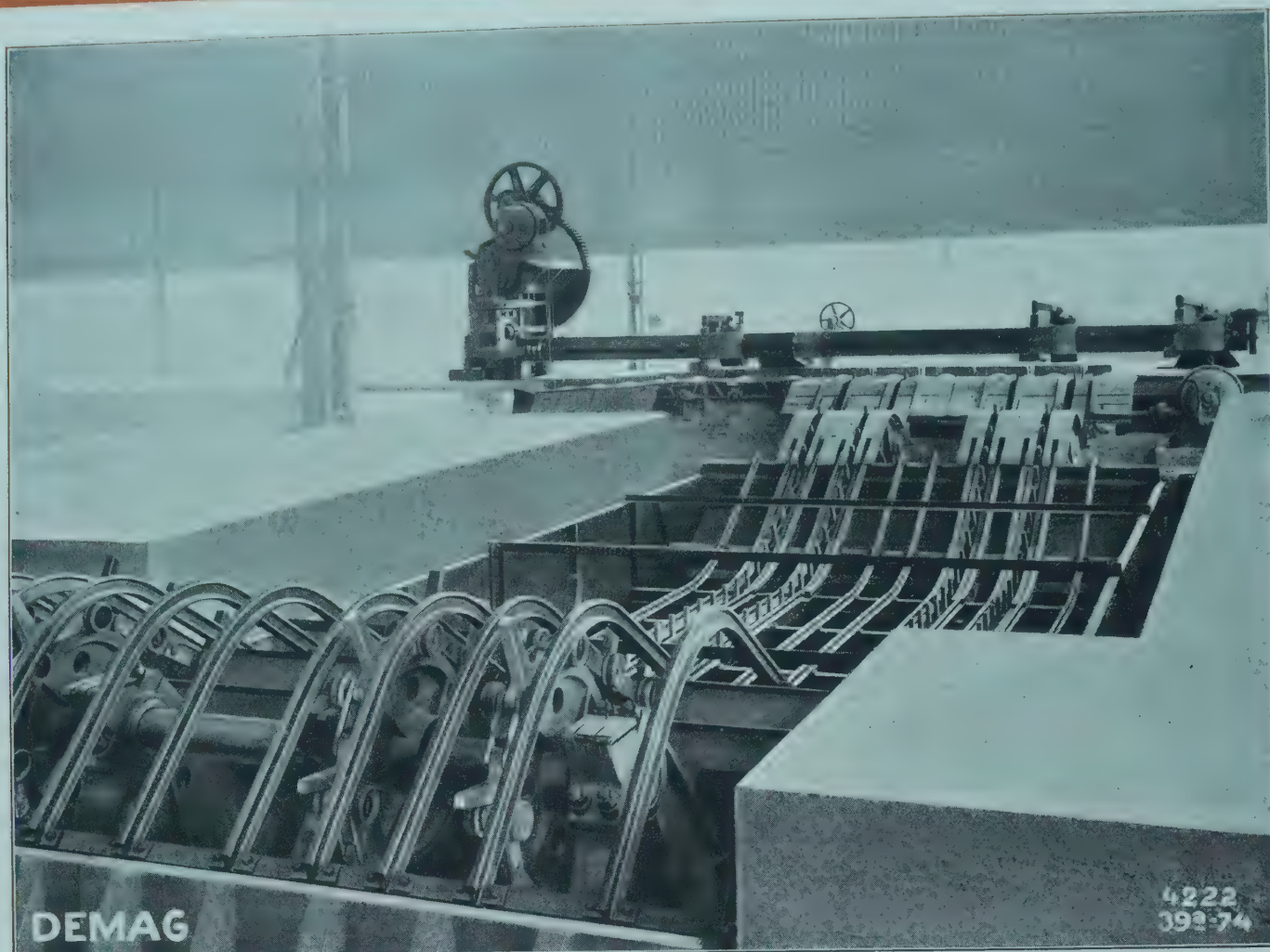


# TRANSPORTING AND LOADING DEVICES FOR BLOOMS AND BILLETS

---

**F**or the rapid and safe transport of the blooms and billets, which are generally warm, from the hall of the rolling shed to the heating furnaces of the finishing rolls, to the storeyard or direct to the loading place, it is necessary to have suitable transporting appliances, and these contribute largely towards the attainment of a maximum efficiency in rolling mills. The equipment of the rolling mill sheds and storeyards with suitable appliances for transporting or loading the blooms and billets is therefore indispensable. The construction of these appliances differs very much according to local circumstances. The ordinary means of transport for billets is the claw crane, and for short and warm billets buckets which are taken up by the cranes mentioned and tipped by suitable device when they are to be unloaded. Great preference is often given to magnet cranes, especially when short, cold and thick billets are to be piled up in rows. If the freshly rolled and cut billets are to be loaded as quickly as possible they must be rapidly cooled, and this calls for appliances which, without disturbing the rolling process, are in a position to cool the individual billets one after another and thus enable them to be speedily loaded. These so-called billet cooling devices consist in the main of a trough filled with water, through which electric skids are conducted by means of tappet chains. The latter convey the billets slowly through the trough, at the end of which they drop them into a hurdle, out of which the claw crane lifts and loads them.

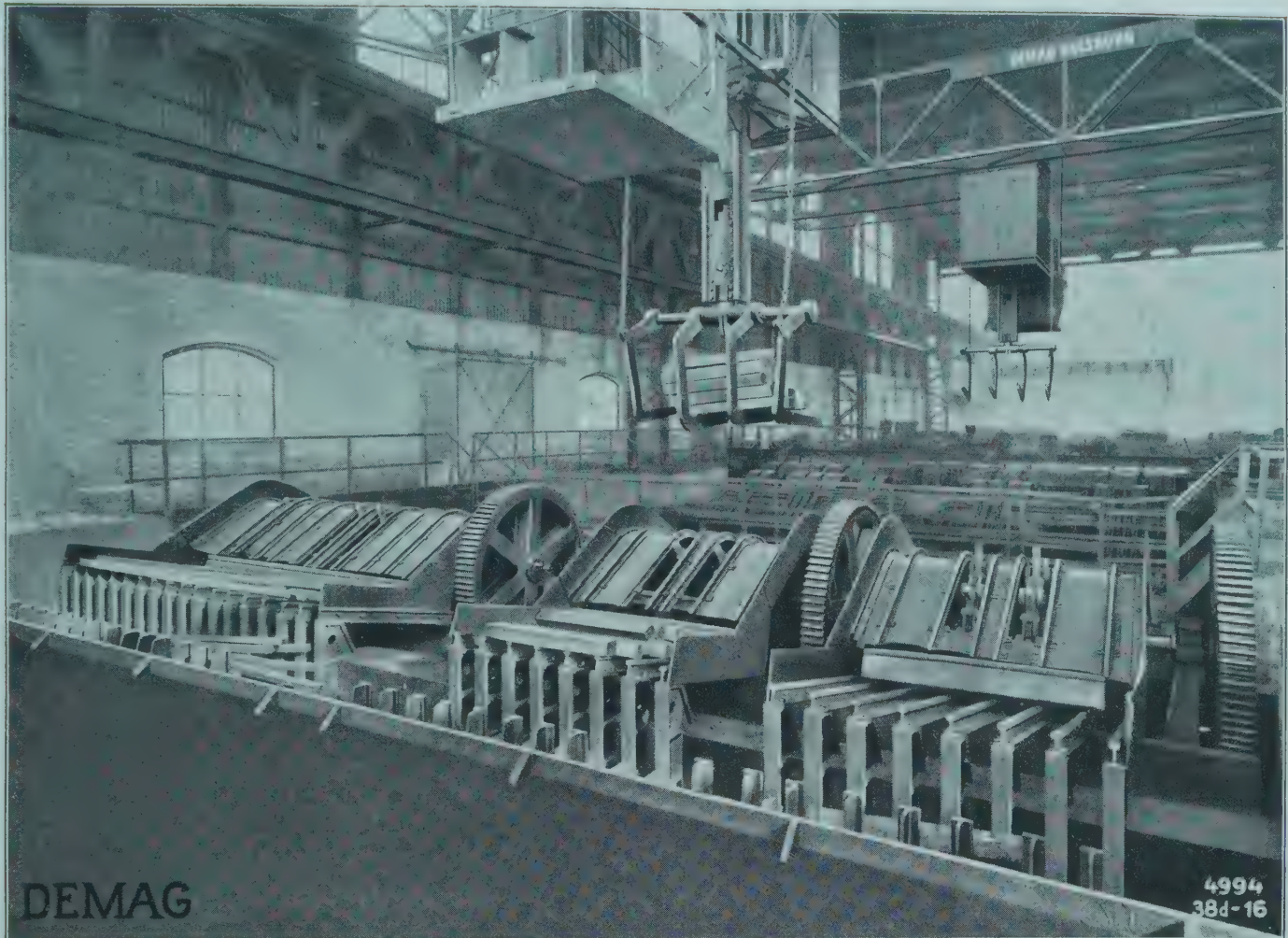




COOLING TROUGH FOR BILLETS WITH SKIDS ATTACHED  
SOCIÉTÉ ANONYME D'ATHUS-GRIVEGNÉE, ATHUS (BELGIUM)

**I**n the background of this illustration may be seen an electric billet shearing machine. The billets cut by this machine are pushed off the roller gear by special narrow gauge skids and fall down an inclined plane into a hollow. From here the tappets of the trough skid conduct them slowly through the trough, which is filled with water. Cold water is kept constantly flowing into the trough, the warm water being led off by an overflow so that the water cannot get warm beyond measure. On reaching the end of the skid the billets, which have now been cooled, fall into a cast iron hurdle, from which they can be hauled in proper order and loaded by a claw crane.

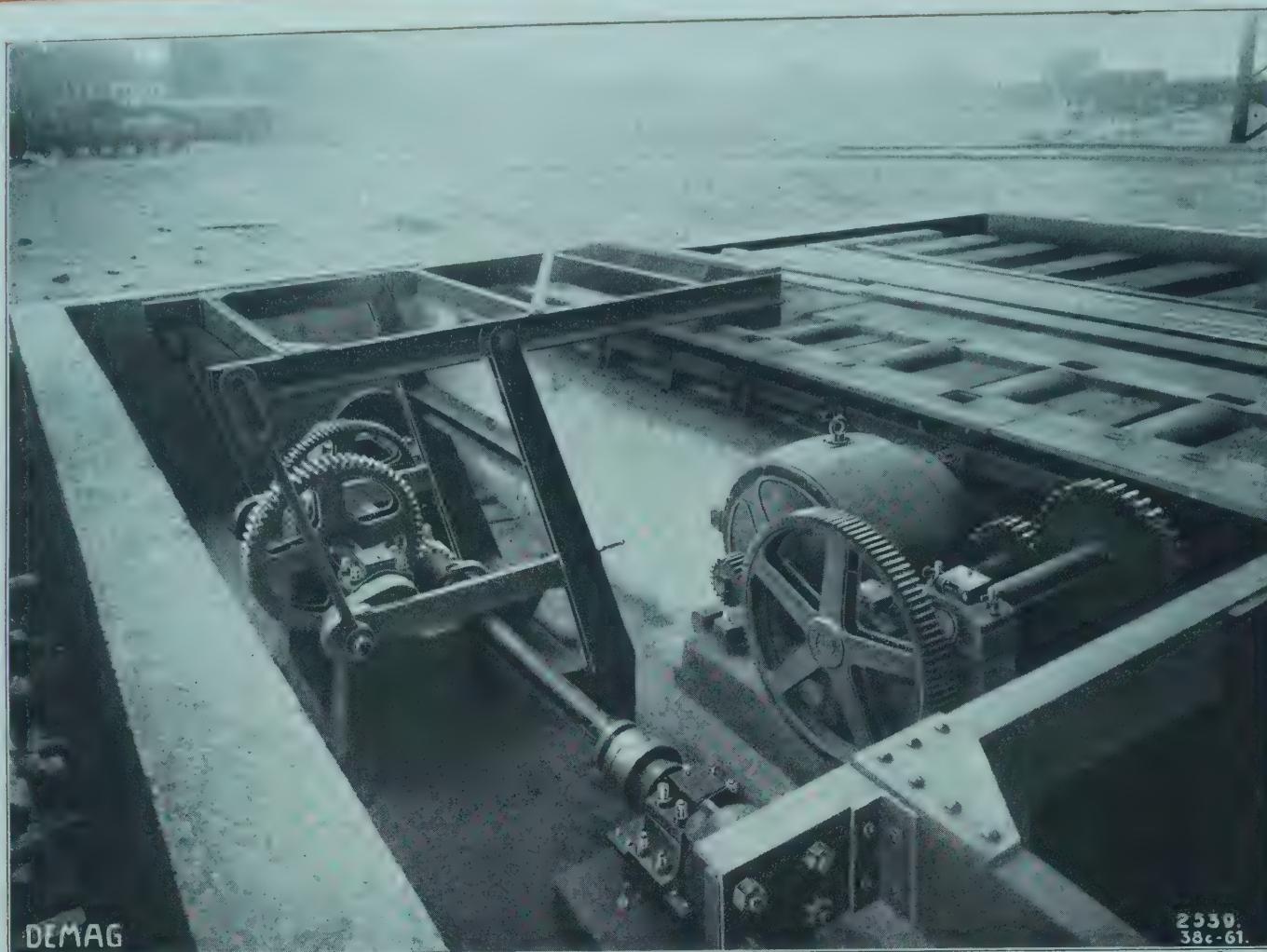




OBERSCHLESISCHE EISENINDUSTRIE, AKT.-GES., GLEIWITZ  
FOR WERK JULIENHÜTTE IN BOBREK (UPPER SILESIA)

**T**he illustration shows a billet cooling device similar in construction to the one on page 70. This plant is divided into three groups, two of which transport short billets through the cooling trough and one group long ones. After being cooled the billets are taken away by two claw cranes.

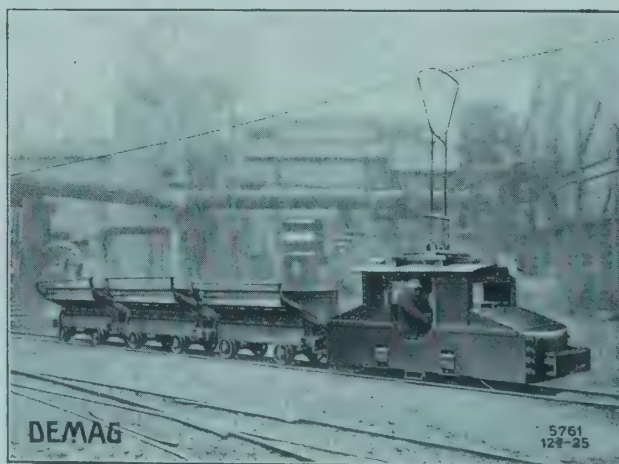
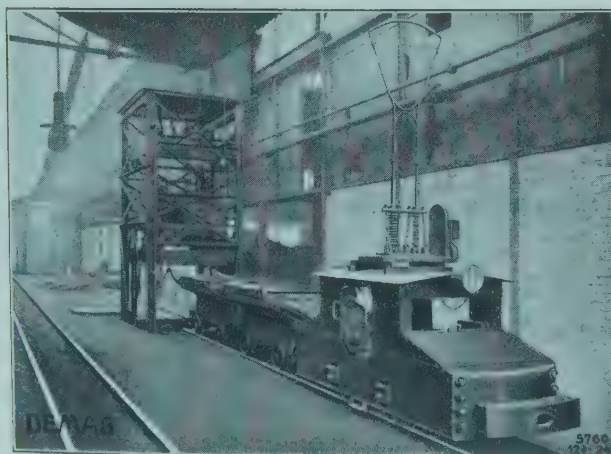




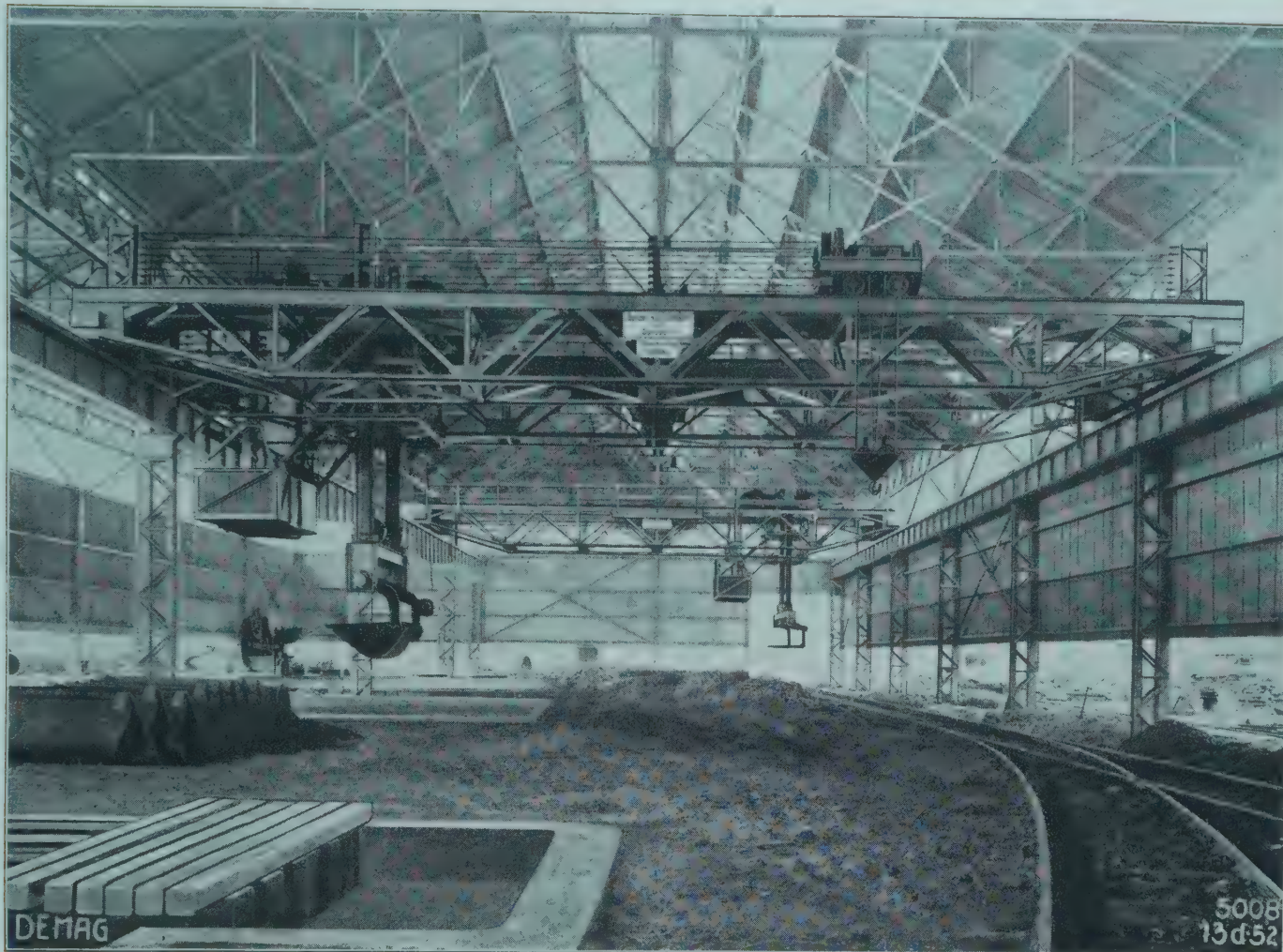
BILLET PUSHER / DELIVERED FOR A RHENISH METALLURGICAL WORKS

**T**he above device is often attached behind the shearing machine. As the billets come up from the shearing machine it pushes them off the roller gear onto a grating from which they are lifted by the claw cranes. The grating is constructed specially to suit this purpose.

Billet cars drawn by an electric mine locomotive. / Delivered for the Deutsch-Luxemburgische Bergwerks- und Hütten-Aktien-Gesellschaft, Dept. Differdingen.







TWO CLAW CRANES TO CARRY 5000 TO 10000 KILOS / DELIVERED FOR THE SOCIÉTÉ ANONYME D'ATHUS-GRIVEGNÉE, ATHUS (BELGIUM)

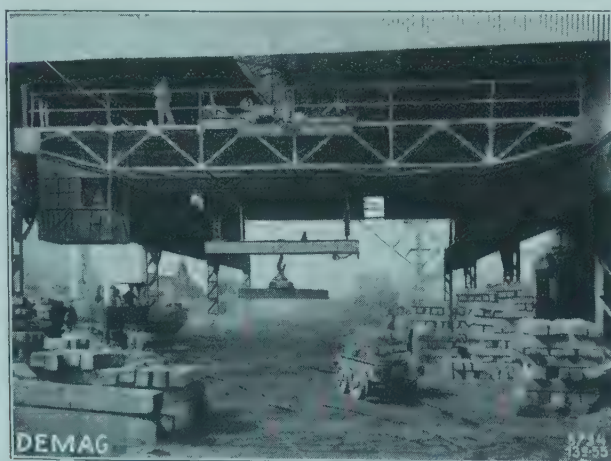
**T**he foremost crane, with a lifting capacity of 10 000 kilos, conveys either the buckets filled with billets or the blooms and billets which the billet pusher has pushed off the roller gear onto the grating shown in the foreground of the above illustration. The claw crane in the background, which has a lifting capacity of 5000 kilos, removes the billets that have been cut by the saws and conveyed to the hot banks, as well as those coming from the cooling trough.





MAGNET CRANE FOR TRANSPORTING INGOTS, SPAN 17 METRES  
LIFTING CAPACITY 8000 KILOS / DELIVER. FOR DE WENDELSCH  
BERG- U. HÜTTENVERWALTUNG ROSSLINGEN, KR. DIEDENHOFEN

# MAGNET CRANE MAGNET CRANE



DELIVERED FOR USINES METALLURGI-  
QUES DU HAINAUT SOC. AN. COUILLET



DELIVERED FOR THE GELSENKIRCHENER  
BERGWERKS-A.-G., DEPT. HÜSTEN i. W.





MAGNET CRANE FOR TRANSPORTING INGOTS / DELIVERED FOR THE EICHENER WALZWERK- UND VERZINKEREI-AKTIENGESELLSCHAFT, KREUZTHAL nr. SIEGEN IN WESTPHALIA

I N G O T   C R A N E   M A G N E T   C R A N E



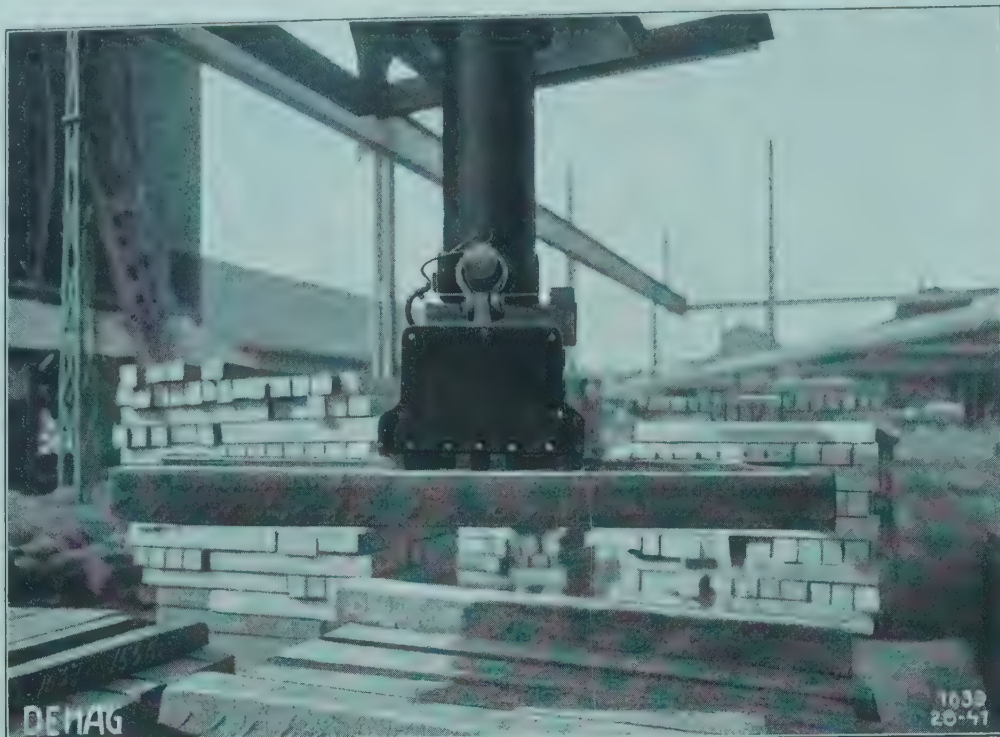
DELIVERED FOR RHEINISCHE STAHLWERKE, A.-G., DUISBURG-MEIDERICH



DELIVERED TO THE PRESS- UND WALZWERK, A.-G., DÜSSELDORF-REISHOLZ



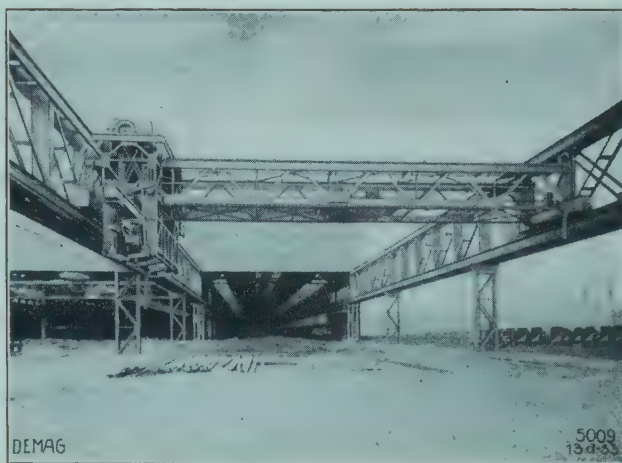
# MAGNET TRANSPORTING BILLETS



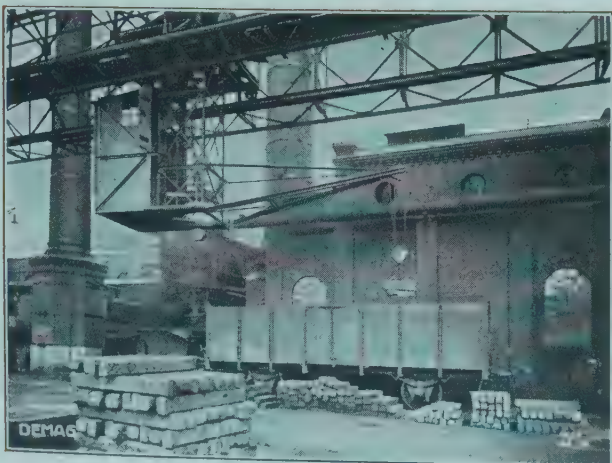
The movable poles enable the magnet to lie quite close on the rolled material, even when the latter is not flat or smooth, thus giving a guarantee for absolutely safe transport.

**MAGNET CRANE**  
for transporting bil-  
lets and section iron.

Suitably attached  
beneath the magnets  
are claws, which close



when the load has  
been taken up by the  
magnets. This pre-  
vents the rolled ma-  
terial from falling off  
during the transport.



# MAGNET CRANES FOR TRANSPORTING INGOTS



## COMPRESSED AIR AS A SOURCE OF POWER IN ROLLING MILLS

---

**I**n addition to hydraulic power compressed air plays no unimportant part in the work of rolling mills, for example, for working the chisel hammers that have recently been applied for dressing the rolls of big mills, the hammer drills for demolishing old foundations and the rammers for making new ones etc. With the help of these pneumatic tools a good deal of time can be saved when doing the above-mentioned work, and much better results are obtained. Moreover, compressed air can often be used to advantage instead of hydraulic power for working small trunnion hoists or for finishing or other auxiliary machines, especially in cases where only low power is required or where on account of the expense or for other reasons it is not thought advisable or profitable to erect a hydraulic plant. Besides the above-mentioned pneumatic tools for rolling mills we also deliver all other pneumatic tools needed for mining, quarrying etc. Our Demag pneumatic tools are distinguished for the simplicity of their design, maximum strength of blow combined with shortness of design, economical utilisation of air, slight kick, great durability and safety of working. As generators of compressed air we deliver single-stage and two-stage compressors, vertical or horizontal, stationary or portable for direct or belt drive by steam, explosion or electro-motors. Our richly illustrated pamphlets on Compressors and Pneumatic Tools may be had free of charge on application. The standard sizes shown in the pamphlets above-mentioned are always built to stock and can therefore generally be delivered at short notice.

In addition to the advantageous application of pneumatic tools in rolling mills the following illustrations show compressors, which are one of our special lines.





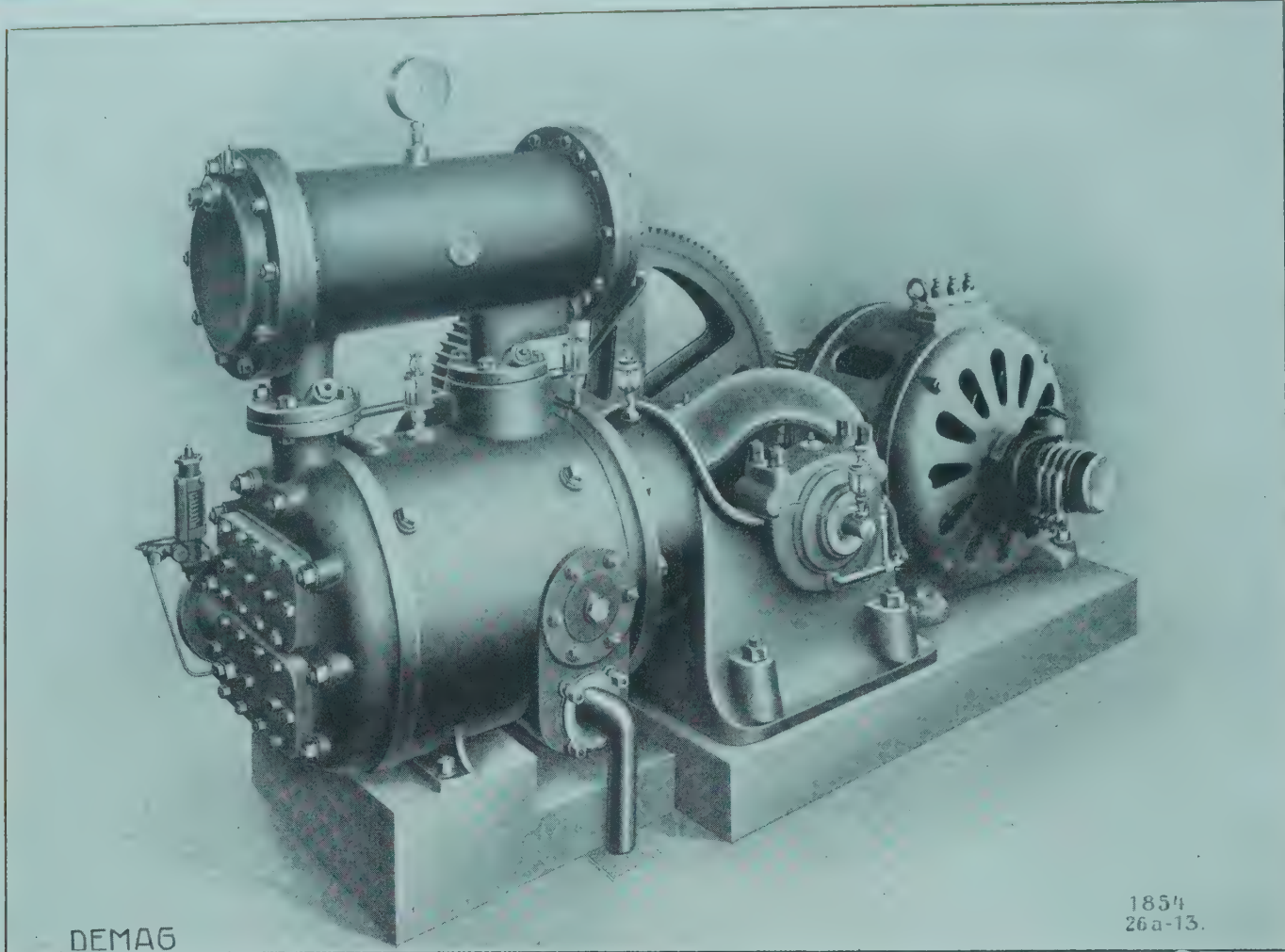
**I**n rolling mills hammer drills can also be employed to advantage. The above illustration shows the application of Demag Hammer Drills for the demolition of the foundations of a rolling mill. If done by hand this work would require a lot of time, whereas boring with the hammer drill considerably facilitates, hastens and cheapens the work. Detailed descriptions of Demag Hammer Drills, Drilling Machines etc. are contained in our special catalogue on „Mining“.





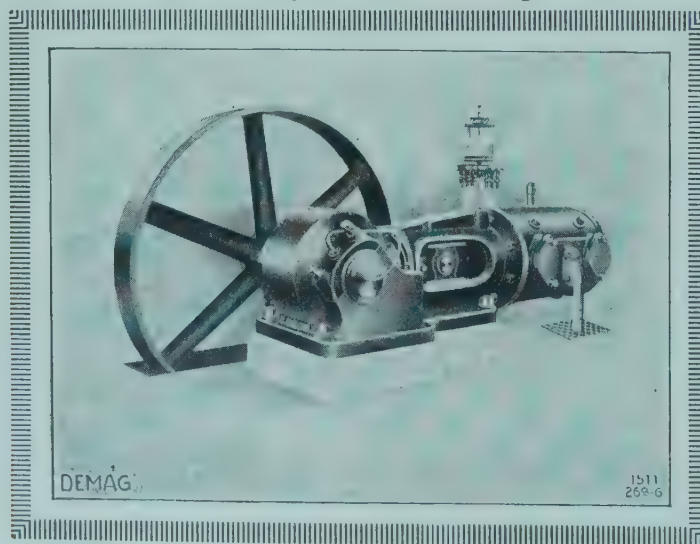
**D**emag Hammer Drills do good service not only for the demolition of foundations but also for their construction. The above illustration shows the making of new foundations with the help of the Demag Pneumatic Rammer. Of late this rammer has become exceedingly popular. Formerly its faults and the high price stood in the way of its application, but now, their disadvantages having been done away with and the price considerably reduced, they are also in frequent use even in small concerns.



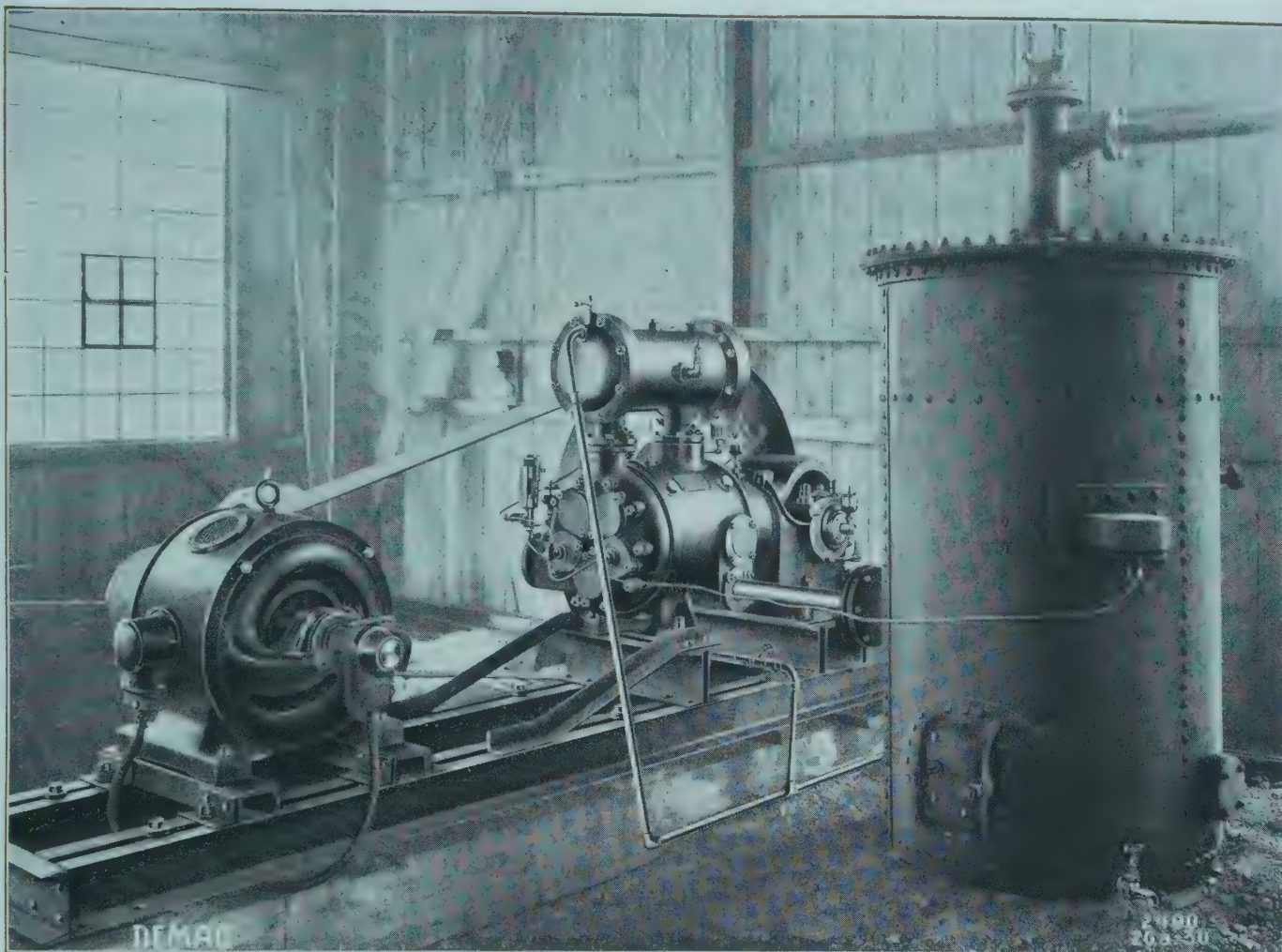


**F**or the generation of compressed air we deliver compressors of the most varied constructions, with direct electric drive, with belt drive, or quite portable compressed air plants driven by electromotors or by explosion motors. The above illustration shows a two-stage compressor with electric drive.

Single-stage compressor with fast pulley, tail bearings, forked frame and central lubrication. The compressor has a suction capacity of 3.5 cbm. per minute.

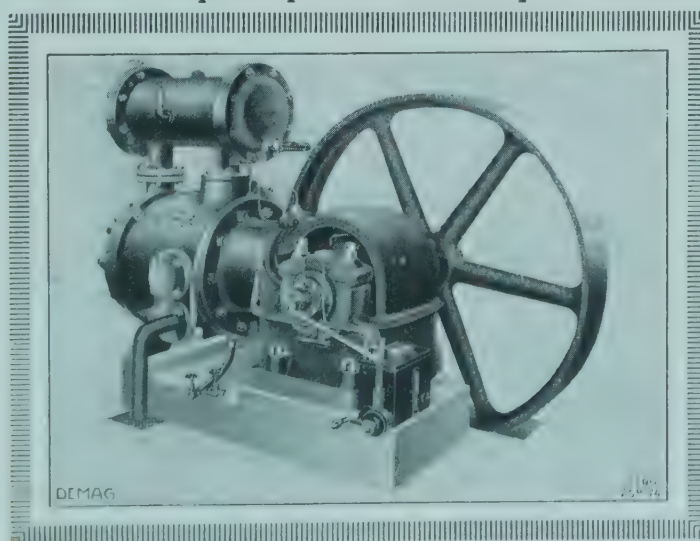






**C**ompressed electric driven air plant for erection purposes. To facilitate their erection at the building site compressor and motor are fitted on a common wrought iron frame. Heavy wooden beams led partly into the ground prevent the apparatus from slipping about.

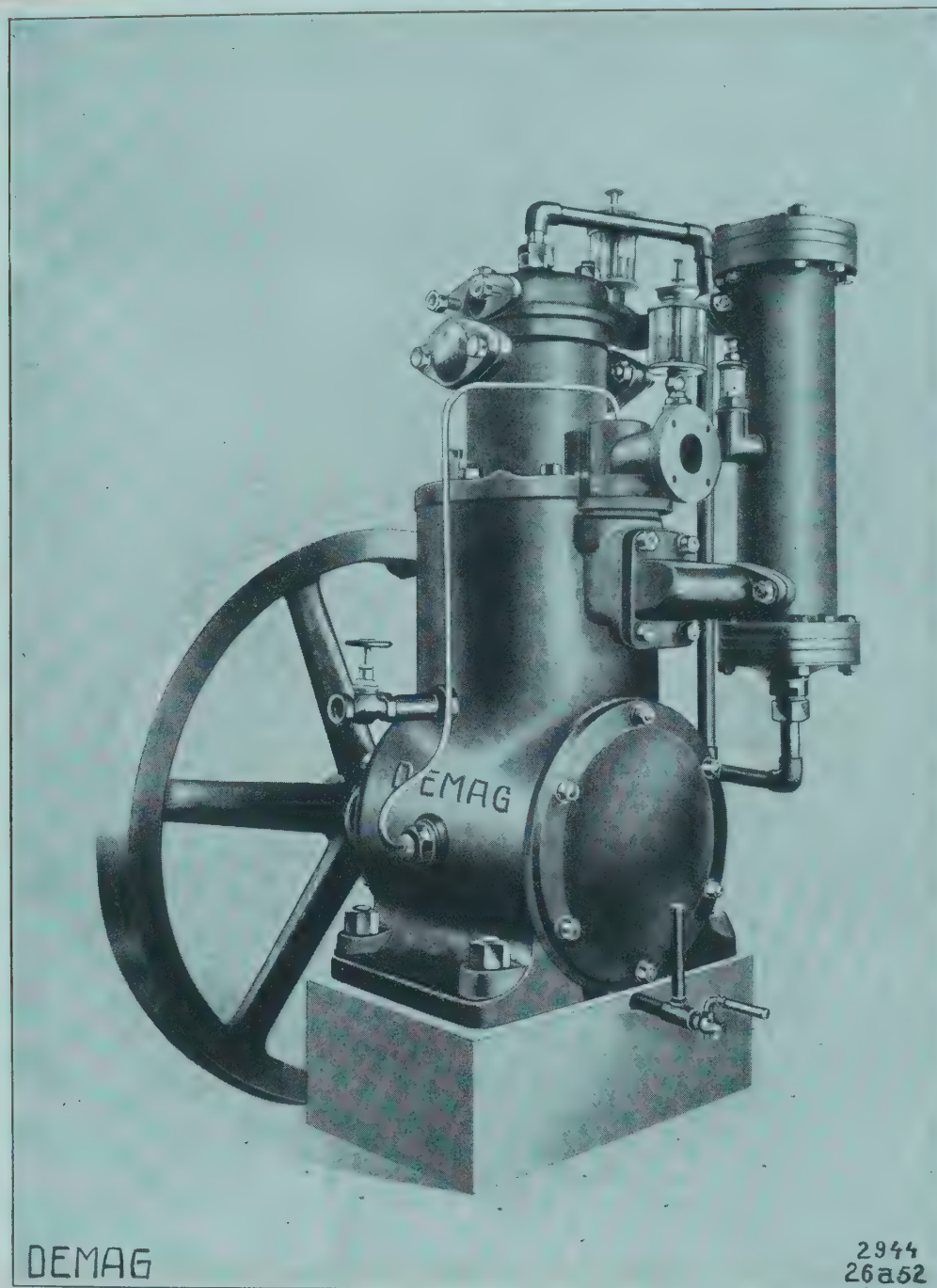
Two-stage single cylinder compound steam compressor for belt drive, fitted with central lubrication, worked by a rocking lever. Ordinary suction output up to 23 cbm. per minute.





## **V**ERTICAL COMPOUND STEAM COMPRESSOR FOR HIGH PRESSURE

For high pressures beyond those attained by our standard compound steam compressors we build special types, which work most economically and satisfy the requirements as to volume of suction air and final pressure. The



DEMAG

2944  
26a52

construction varies from case to case according to local circumstances and other requirements. On receipt of particulars as to motive power, the desired final pressure and the volume of suction air required we shall be pleased to make quotations for such special types. Moreover we call attention to our special pamphlets and to our catalogue on "Mining".



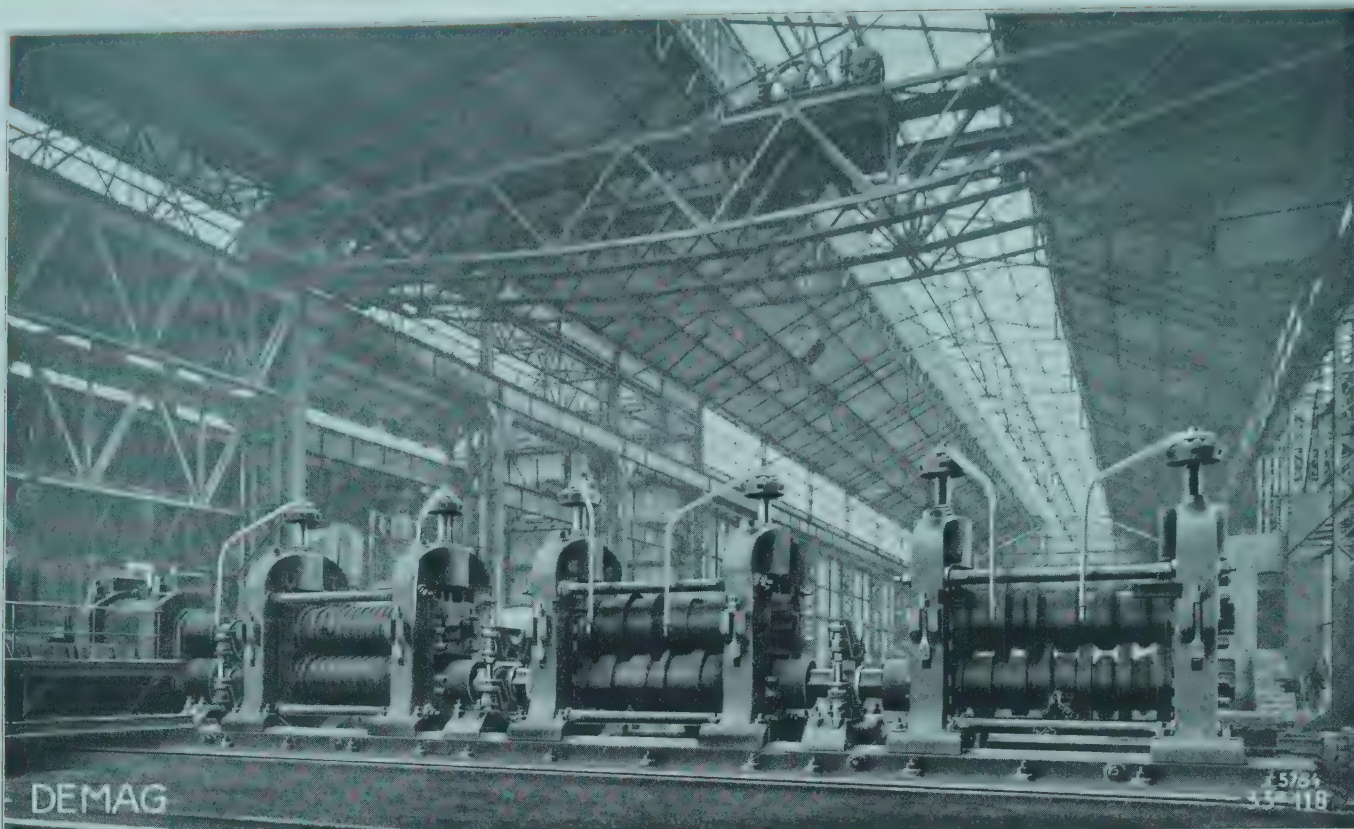


## ROLLING MILL FOR RAILS, GIRDERS AND SECTION IRON



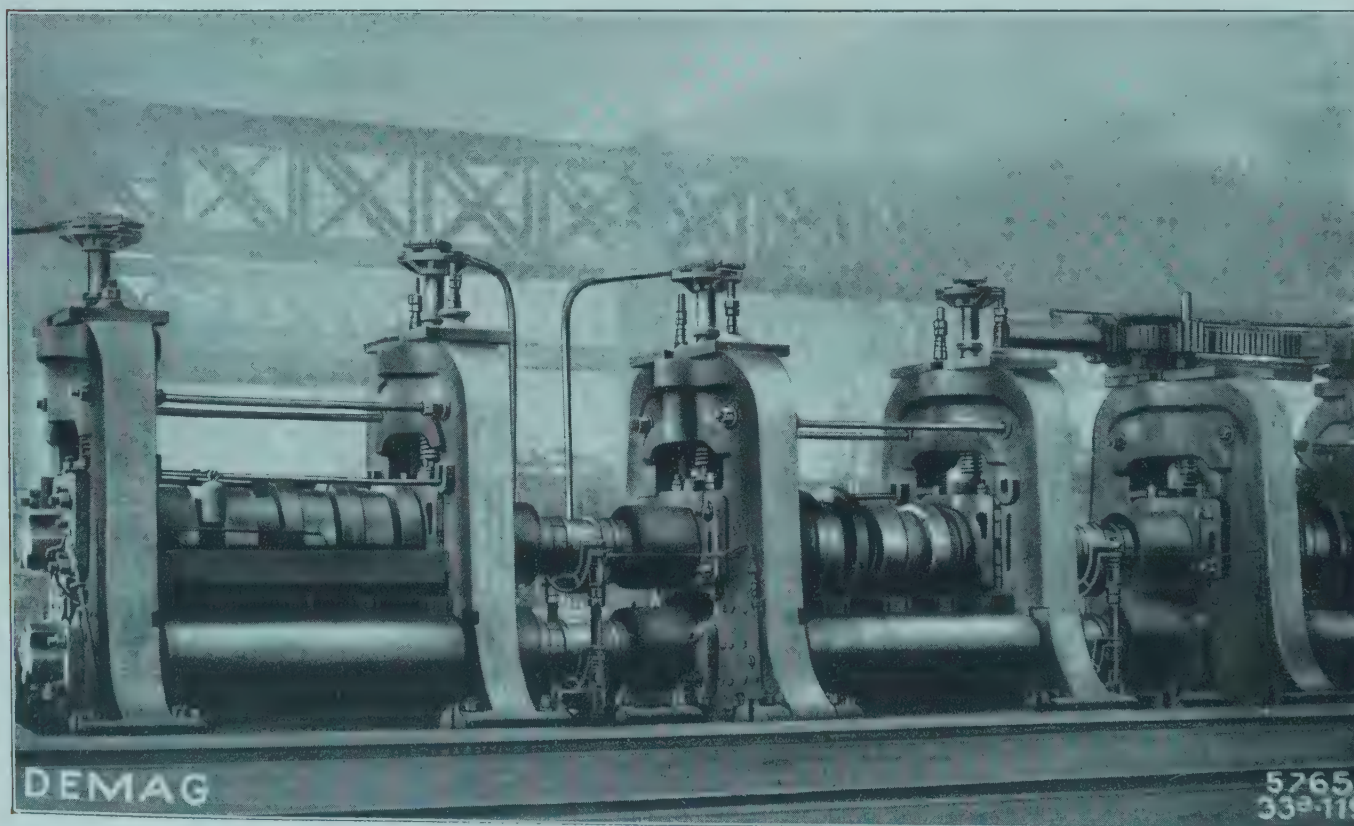
**T**hese rolling mills are employed for producing from the material coming from the blooming mill all heavy sections, such as I-iron girders, channel iron, rails for railway tracks, sleepers, angle iron, and other kinds of heavy sections, a special set of rolls with suitable grooves being built into the machine for each description of section. Whereas in the blooming mills a number of necessary passes can be formed during the rolling process by raising and lowering the top roll, so that the blooming mill rolls require only a small number of turned-in grooves, in the section iron mills the rolls must have all the grooves needed for the desired sections, because on the one hand the top roll cannot be adjusted during the rolling process and, on the other, complicated sections have to be produced. The housings are made in such a way as to enable the rolls to be interchanged without any loss of time due to extra work. Heavy section rolling mills are always constructed two-high, lighter ones three-high. In the former the material to be rolled is conducted to the various grooves by the roller gear which is laid before and behind the mill, in the latter this work is usually done by stationary or travelling lifting or oscillating tables driven by pneumatic, hydraulic or electric power. Their rolls are all driven by electricity in order to enable the bar on leaving one groove to be quickly and safely transferred to the next one, without manual labour. The transporting of the material from one housings to another is effected either by the electric skids, the cars of which run in guides with the tappets which are situated above floor level, or by means of travelling lifting tables. When the material has passed through the rolling mill for the last time the finished bar is conveyed by a roller gear to the saws, where it is cut to certain lengths, after which it is drawn to a hot bank where it is allowed to cool down slowly. After being sufficiently cooled the material is transferred to the finishing department by so-called claw cranes, and there it passes through the various finishing machines which finish it and make it ready for leaving the works.



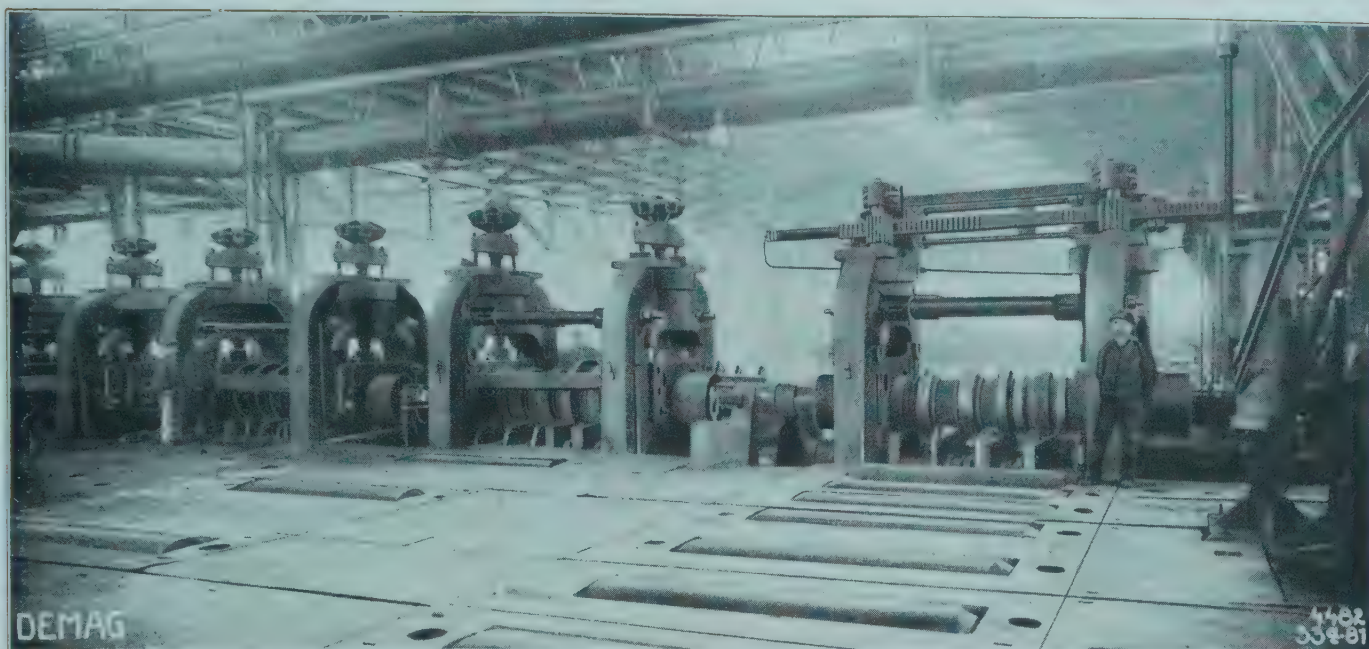


HEAVY TWO-HIGH GIRDER ROLLING MILL / DELIVERED TO THE SOCIÉTÉ ANONYME D'OUGRÉE' MARIHAYE OUGRÉE' (BELGIUM)

TWO-HIGH REVERSING ROLLING MILL (950 mm) FOR GIRDERS / FITTED WITH HOUSING ROLLS / DELIVERED TO THE OBERSCHLESISCHE EISENBAHNBEDARFS-AKTIEN-GESELLSCHAFT "FRIEDRICHSHÜTTE", FRIEDRICHSHÜTTE (UPPER SILESIA)







## TWO-HIGH REVERSING MILL (920 mm) FOR HEAVY SECTIONS DELIVERED TO THE ROMBACHER HÜTTENWERKE, ROMBACH

**T**his mill consists of four housings in the first of which the top roll is fitted with hydraulic adjustment, in the others with hand adjustment. Before and behind the mill the material to be rolled is conveyed from one housings to the next by tappet skids.



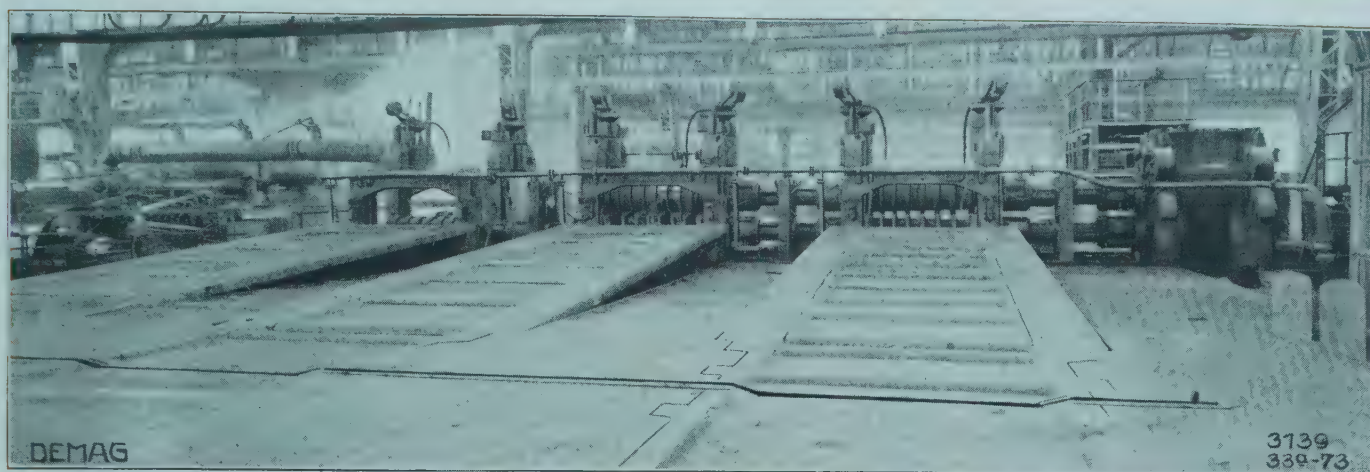




ERECTION OF A 28" GIRDER REVERSING MILL WITH THREE HOUSINGS DELIVERED FOR THE TATA STEEL & IRON CO., KILIMATI (INDIA)

Our delivery included not only the mill proper, but also traveling roller gears, saws, hot banks and the roller gears for the finishing department, as well as a small section rolling mill consisting of roughing mill with three housings the rolls of which were 16" in diameter and two finishing mills of two and three housings respectively, with rolls 10" in diameter and all the necessary auxiliary appliances. In addition to these we also delivered to the above-mentioned firm a blooming mill with rolls 33" in diameter and the necessary roller gears, a billet loading device and a shearing machine for blooms up to 150 mm. square.

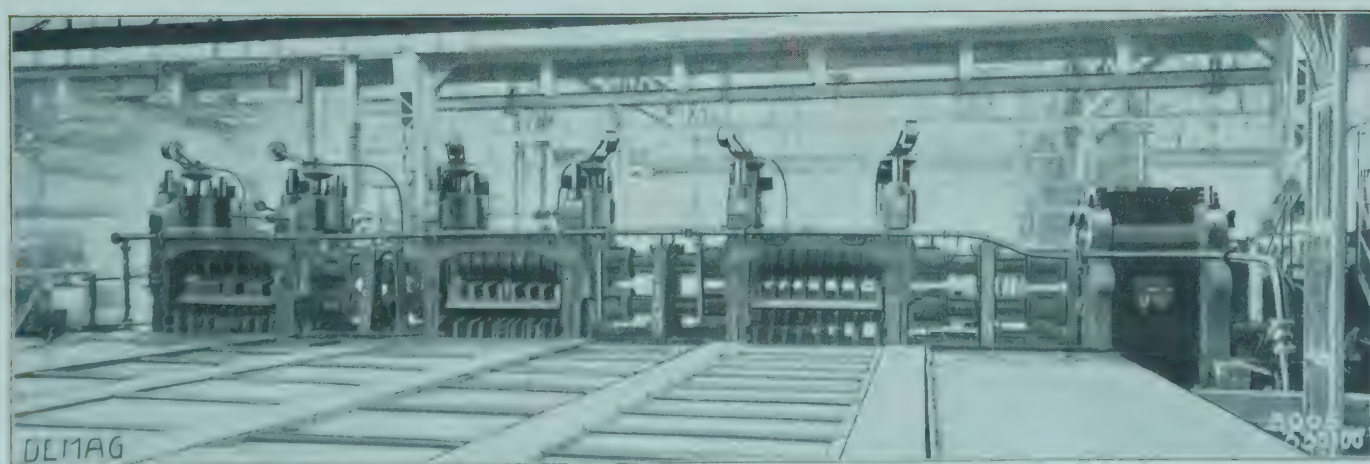




### THREE-HIGH MILL (750 mm) FOR SECTIONS AND ROUND IRON

The illustrations show a 750 mm three-high rolling mill for sections and round iron, consisting of three housings. Behind the mill are electric oscillating tables. In the upper cut the oscillating tables are raised, in the one below they are lowered. Before the first housings there is also an electric parallel lifting table erected, which is raised at the same time as the oscillating table behind the mill. The rolls are driven by means of cranks and levers. The train is run by electricity from a direct current double motor of 11 000 H.P. without fly-wheel, which also supplies the two housings of the 750 mm three-high mill that forms the prolongation of this one.

GELSENKIRCHENER BERGWERKS-AKTIENGESELLSCHAFT, WERK ADOLF-EMIL-HÜTTE, ESCH AN DER ALZETTE (LUXEMBURG)

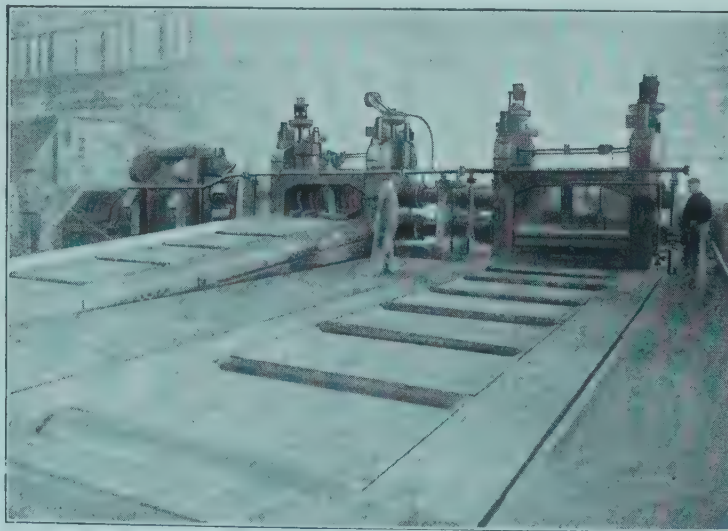




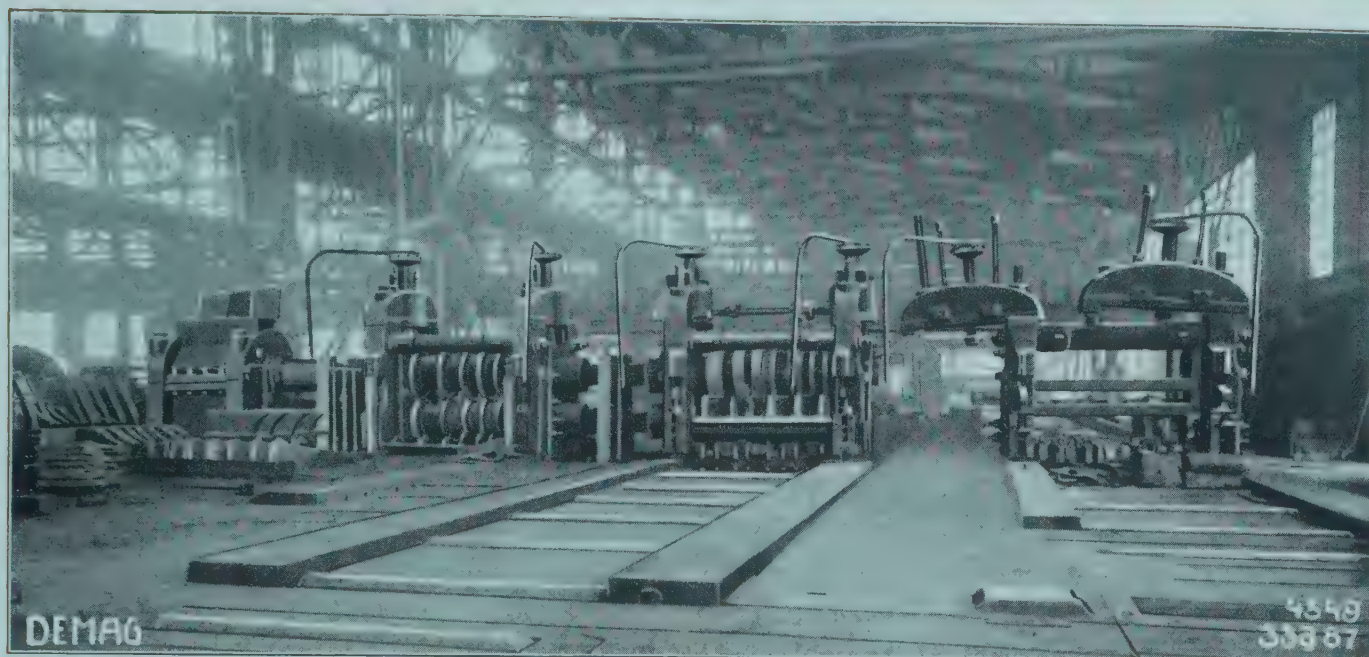


THREE-HIGH MILL (750 mm) / DELIVERED TO THE GELSENKIRCHENER BERGWERKS-A.-G., WERK ADOLF-EMIL-HÜTTE, ESCH (LUXEMBURG)

**T**he upper illustration shows the first housings of the three housings mill depicted on page 87, with the parallel lifting table raised. In the lower illustration is depicted the two housings mill which is coupled up to this three housings mill and run by an 11000 H.P. continuous current motor. Whereas on the three housings mill section iron is chiefly produced, the one with two housings is used mainly for rolling sleepers.







THREE-HIGH SECTION MILL CONSISTING OF THREE HOUSINGS  
DELIVERED FOR THE AKTIEN-GESELLSCHAFT PEINER WALZWERK IN PEINE

**T**o facilitate and, above all, to hasten the interchanging of the rolls the housings are fitted with swivelling hoods. In the upper illustration the last housings is shown with the hoods swung aside. The illustration below also shows a three-high section mill consisting of three housings, which we have delivered to the Rümelingen und St. Ingberter Hochöfen und Stahlwerke, Aktien-Gesellsch., Departement St. Ingbert.



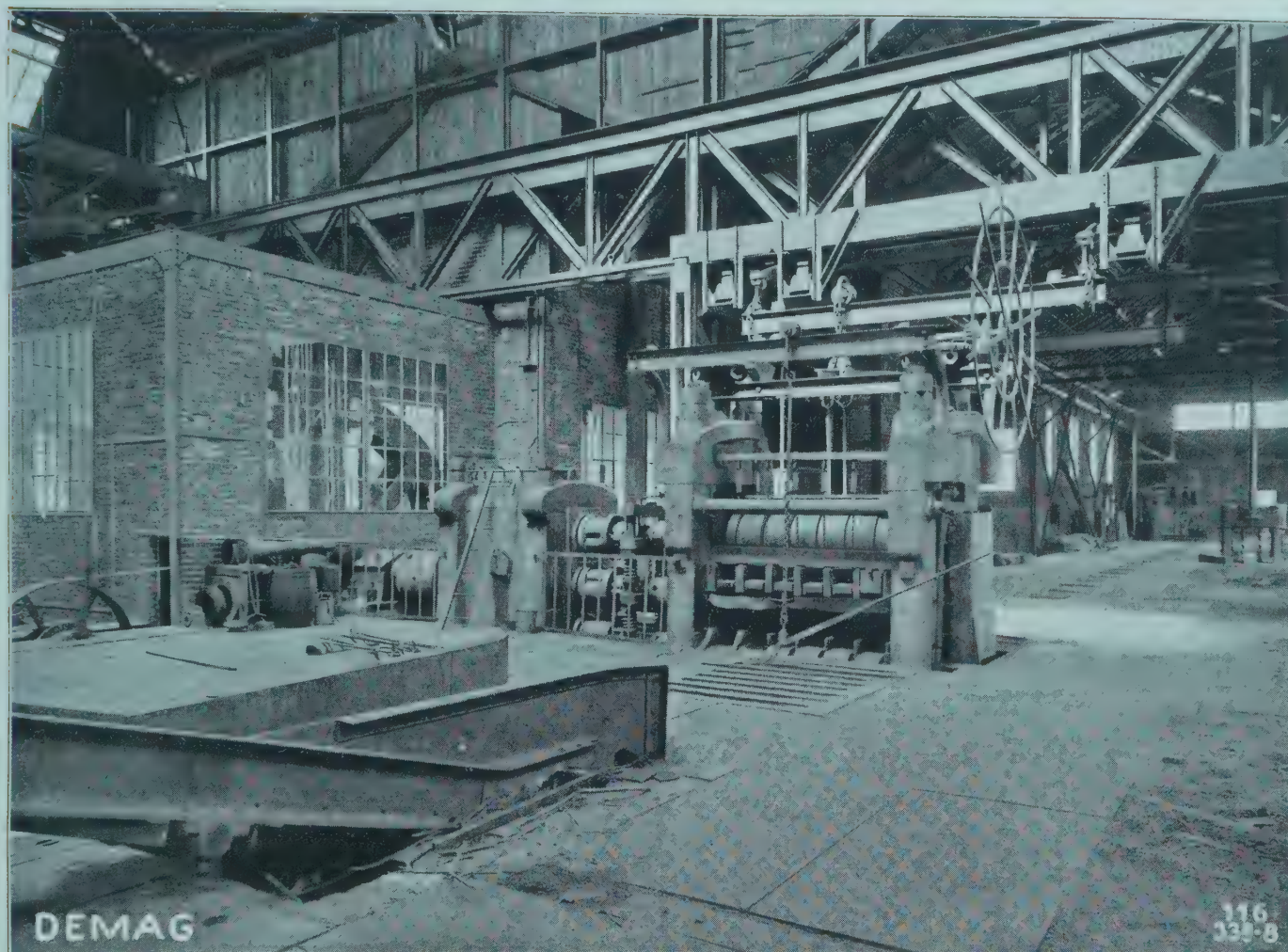




THREE-HIGH ROLLING MILL FOR BAR IRON / DELIVERED  
FOR THE RHEINISCHE STAHLWERKE, DUISBURG-MEIDERICH

**T**he two three-high housings illustrated above constitute the roughing mill of a bar iron rolling mill. The rolls have a diameter of 650 mm. and a barrel length of 1800 mm. In front of the rolls the material to be rolled is fed into the machine by electric roller gears with parallel skids, whilst behind the rolls there is a travelling lifting table.





SHEET BAR ROLLING MILL / DELIVERED FOR THE BERGBAU- UND HÜTTEN-AKTIEN-GESELLSCHAFT "FRIEDRICHSHÜTTE" IN WEHBACH

**T**he three-high housings is fitted with rolls 680 mm. in diameter and with a barrel length of 2050 mm. To facilitate the feed there is in front of the machine a stationary roller gear with power-driven rolls, whilst behind the housings there is a rail which is moved up and down by a steam lifting device to facilitate the lifting and feeding of the sheet billets into the upper grooves.

Six two-high spindle housings of different sizes in our erecting shop.



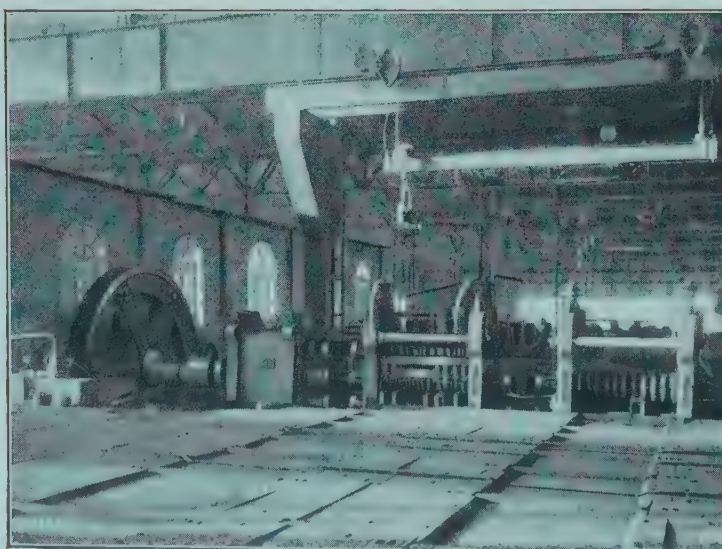
The illustration shows the substantial yet pleasing form of our spindle housings.





SOCIÉTÉ ANONYME D'ATHUS GRIVEGNÉE, GRIVEGNÉE (BELGIUM)

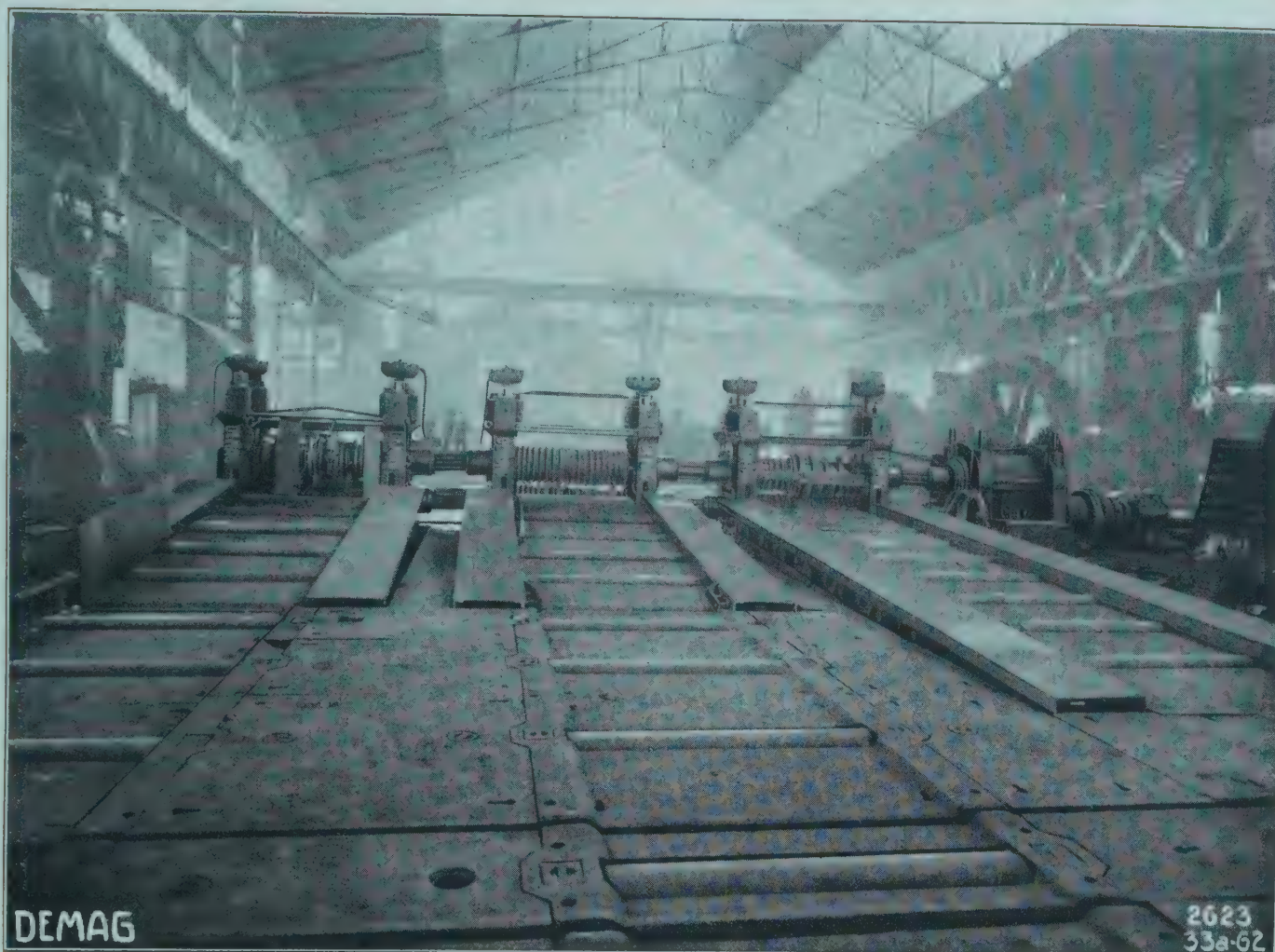
**T**he above illustration shows the 750 mm roughing mill for the finishing mill on the next page. The machine is served by parallel electric driven lifting tables. The tilting and shifting of the material to be rolled is effected by a manipulator in the lifting table.



..... 500 mm. ....  
THREE-HIGH  
MILL WITH  
FIXED LEVER

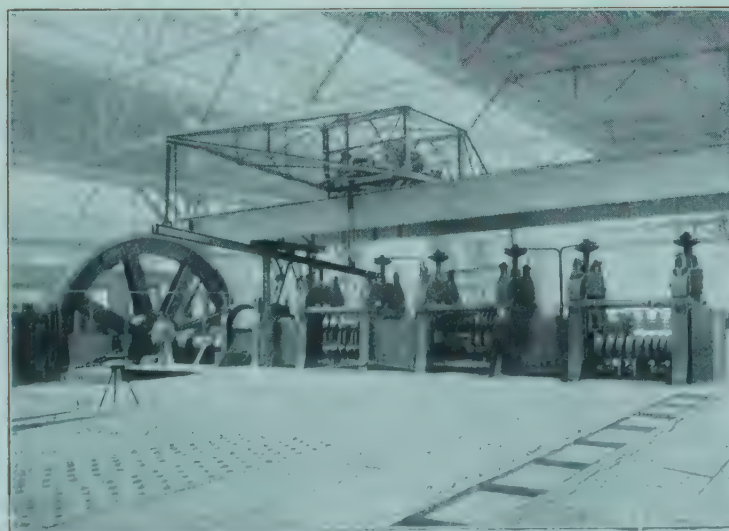
Società Anonima  
di Alti Forni e Fon-  
derie di Piombino,  
Piombino (Italy).





SOCIÉTÉ ANONYME D'ATHUS GRIVEGNÉE, GRIVEGNÉE (BELGIUM)

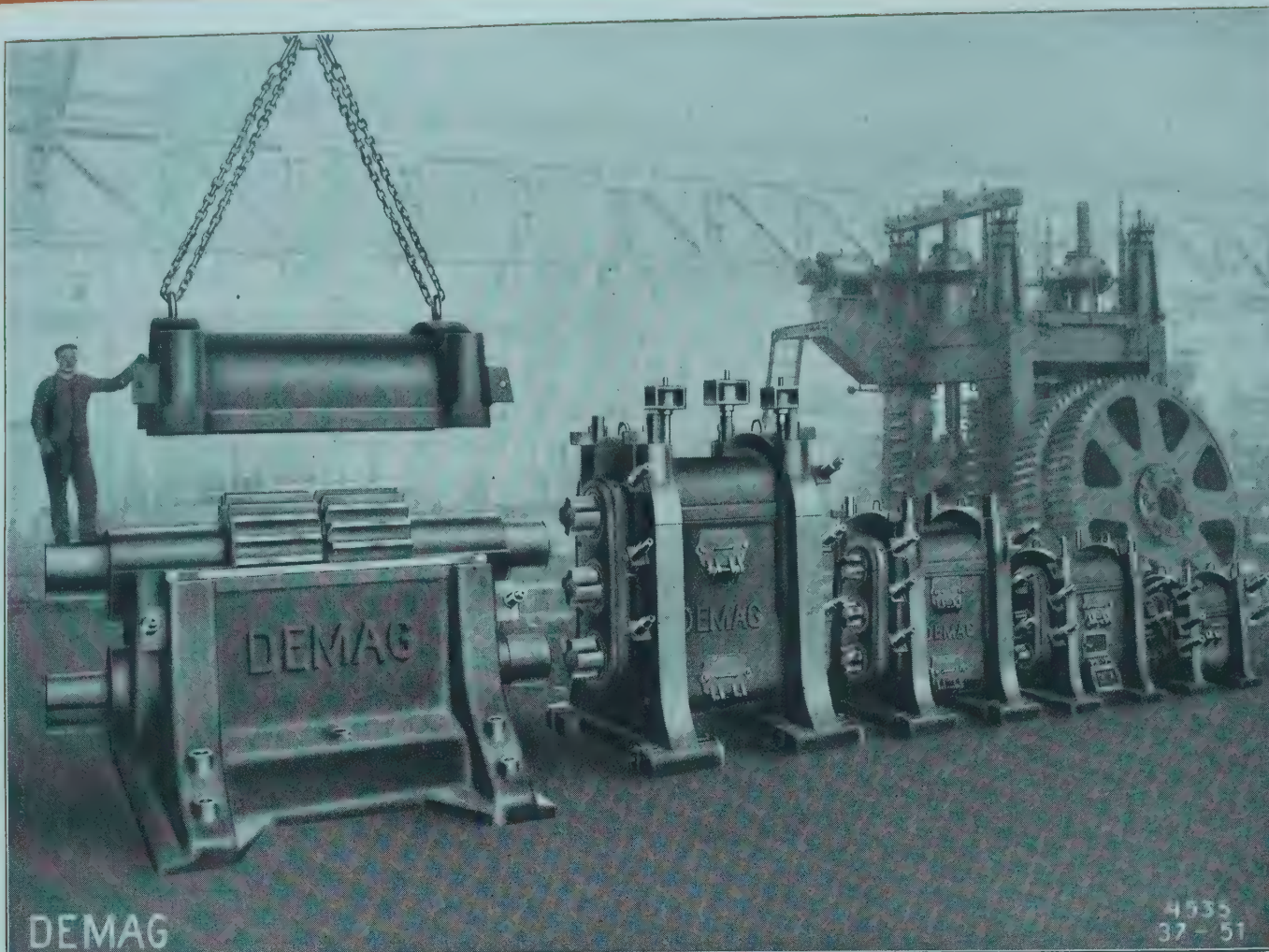
**T**he finishing mill depicted above consists of three three-high housings with rolls 500 mm. in diameter and 1450 mm. barrel length. The mill is used for rolling small and medium sections. Before the mill are stationary roller gears, the rolls of which are run by electricity, and skids; behind the mill are lifting tables worked by electricity.



Three-high Rolling Mill consisting of three housings with travell. lever

Delivered for the STAHLWERK BECKER, A.-G., WILlich, RHLD.

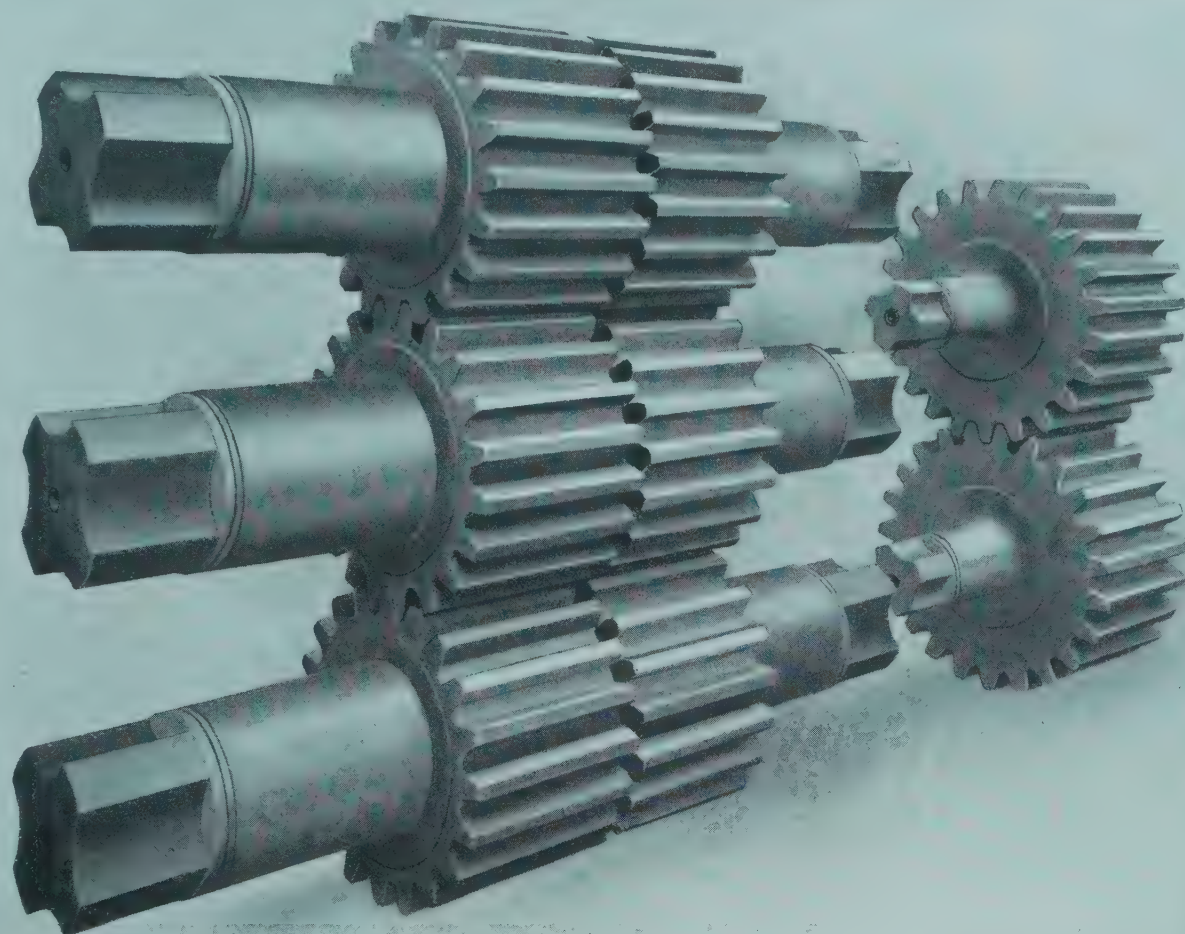




TWO-HIGH AND THREE-HIGH SPINDLE HOUSINGS IN THE ERECTING SHOP

**T**he two-high spindle housings to be seen in the foreground of the illustration shows the powerful construction both of the frame and of the pinions. The latter have straight teeth with half pitch displacement and are made of wrought steel. In the background may be seen the heavy two-high housings of a roughing mill with electric adjustment and hydraulic counterbalancing of the top roll.





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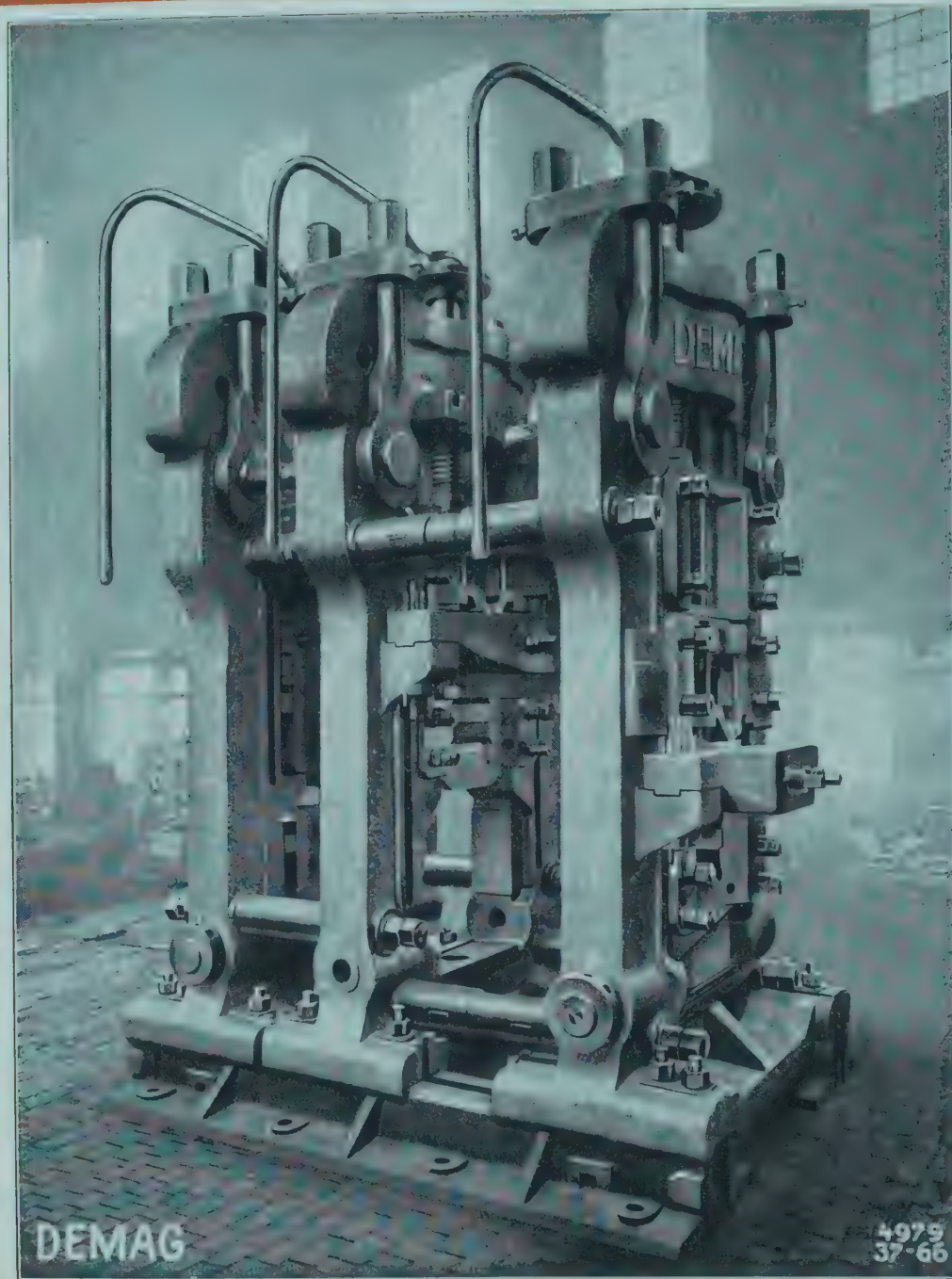
1043  
37-3

## WROUGHT STEEL PINIONS WITH MILLED TEETH

**W**rought steel pinions with straight teeth displaced by half a pitch. Besides these pinions, which are very popular amongst our customers, we also manufacture pinions with single and double helical teeth, of cast or wrought steel. The teeth are milled neatly and free from surface play, thus giving a guarantee for smooth running and a minimum degree of wear and tear.

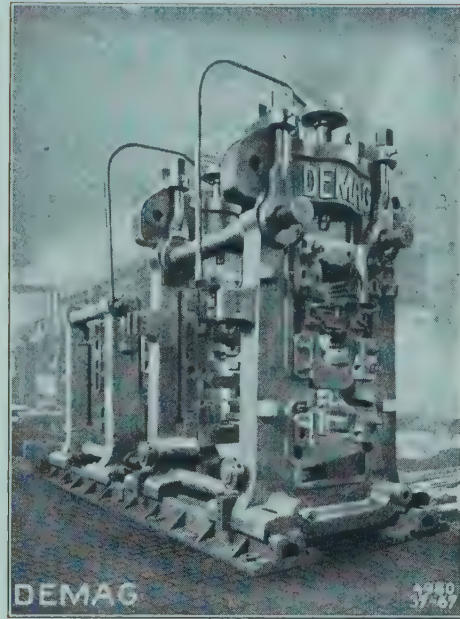
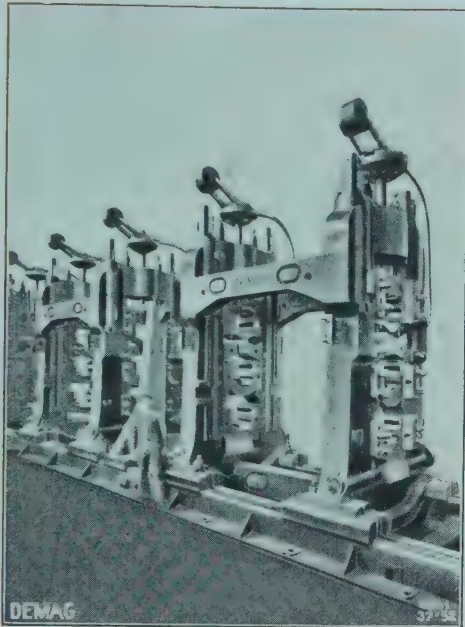


## GROOVED RAIL HOUSINGS

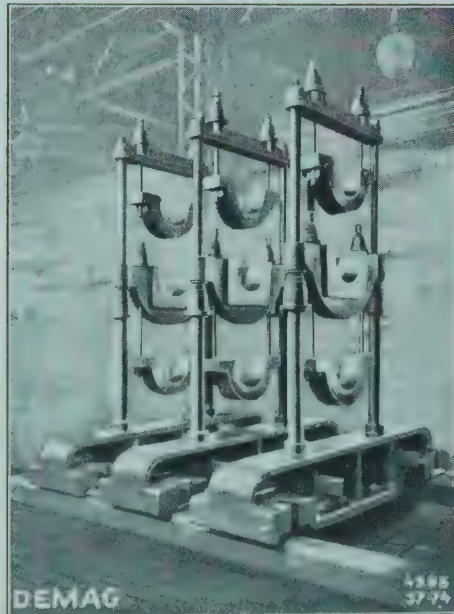
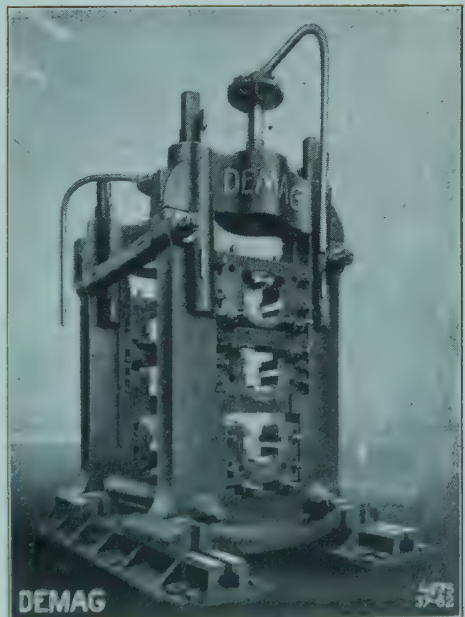


DELIVERED TO THE BOCHUMER VEREIN FÜR  
BERGBAU UND GUSSTAHLFABRIKATION,  
BOCHUM IN WESTPHALIA



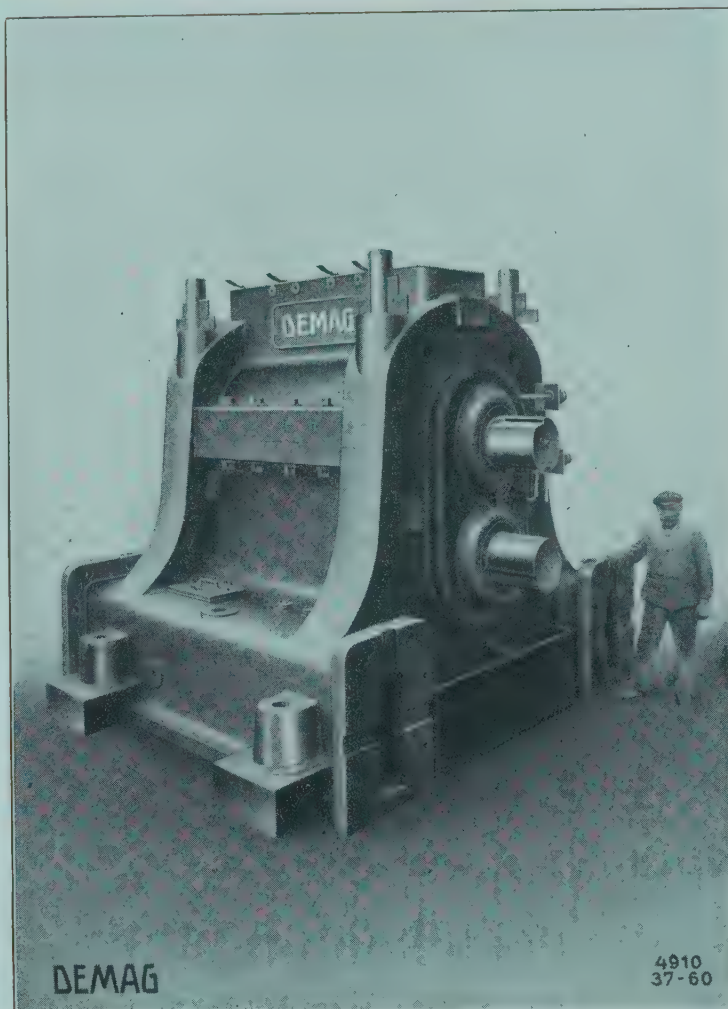


THE ILLUSTRATIONS 1 TO 3 SHOW THE HOUSINGS FOR THREE-HIGH SECTION MILLS. / FIG. 4 DEPICTS THREE SPINDLE BRACKETS ERECTED IN THE ERECTING SHOP





## SPINDLE HOUSINGS FOR



800 mm TWO-HIGH MILL



# ROLLING MILL CRANES

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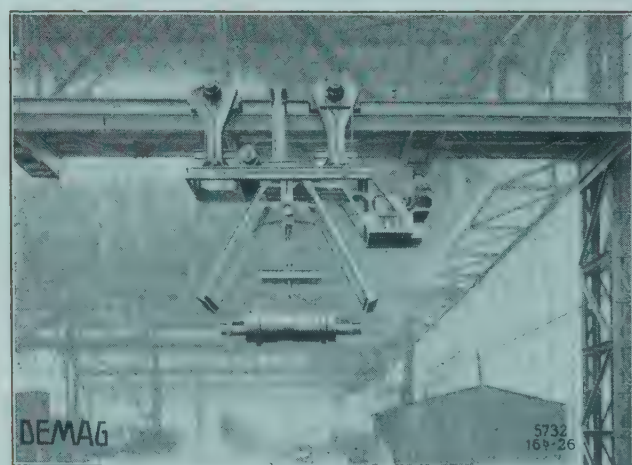
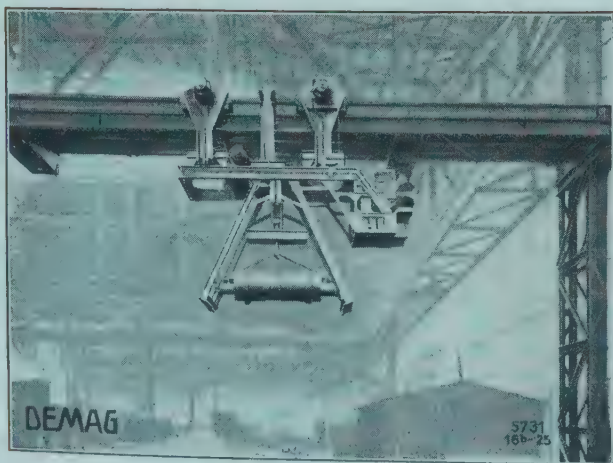
**I**n the loading and transporting of the material in steel works and rolling mills the conveying expenses play a very important part, so that efforts are constantly being made to reduce these latter as much as possible, and this can best be attained by the application of efficient crane plants which do away with manual labour, or rather reduce it to a minimum. Cranes can therefore be employed to advantage for transporting the rolls, special gripping devices being attached for taking hold of the rolls. In the changing of the rolls the crane also plays an important part, enabling the work to be done with much greater rapidity and safety than with other appliances, pulley blocks etc., such as are still in use in some old works to this day. In modern plants cranes always run above the mills, as they have become indispensable for reconstruction work etc., and especially for the erection of the rolling mill. In special cases electric or steam cranes which run along the floor, so-called locomotive slewing cranes, are employed. Like any other locomotives these possess great freedom of motion and can also be used outside the rolling sheds for the most varied purposes, such as traction, for shunting railway cars or serving the storeyards for the rolls etc. For big roll stores it is advisable to erect cranes with a broad span so as to give them as large a service area as possible. Cranes that work in the open air are fitted with a weatherproof driver's stand. Besides cranes, monorail crabs with driver's stand are also used for the above-mentioned purposes. These can be employed in small plants with limited space to advantage as they take up but little room. The lifting and conveying appliances required in rolling mills differ so much in their construction according to local circumstances that it is impossible to illustrate each individual kind of construction in the limited space at our disposal. We therefore confine ourselves to a few typical examples.





**ELECTRIC ROLLER LOCOMOTIVE SLEWING CRANE  
DELIVERED FOR THE STAHLWERK RICH. LINDENBERG, REMSCHEID**

The illustration to the left shows a motor crab for transporting rolls with the safety gripper hitched on, the illustration to the right with the safety gripper hitched off. Delivered for the Façoneisenwalzwerk L. Mannstaedt & Co., Aktien-Gesellschaft, Troisdorf nr. Cologne on Rhine.

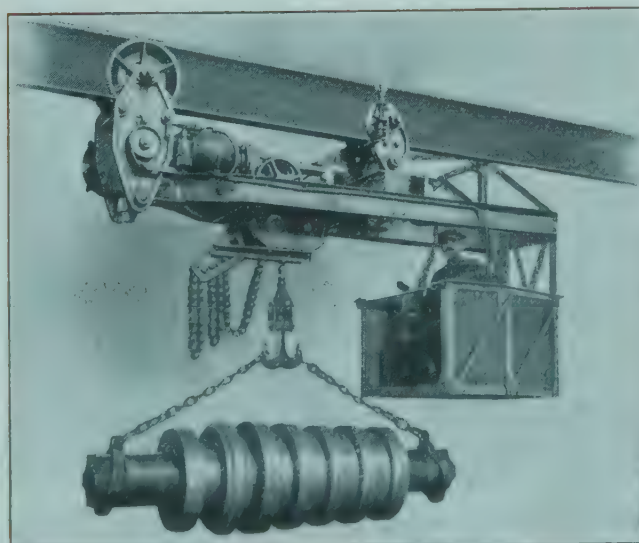






**ELECTRIC OVERHEAD TRAVELLING CRANE TRANSPORTING  
ROUGHING ROLLS / DELIVERED FOR THE GELSENKIRCHENER  
BERGWERKS-AKTIENGESSELLSCHAFT, DEPARTMENT  
ADOLF-EMIL-HÜTTE, ESCH AN DER ALZETTE (LUXEMBURG)**

**MONORAIL CRAB  
WITH DRIVER'S  
STAND  
TRANSPORTING  
ROLLS**



**LARGE  
NUMBERS  
MADE, EASY TO  
MANIPULATE**

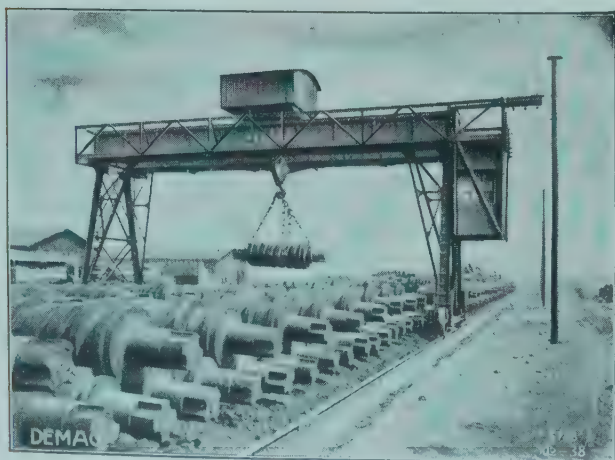




ELECTR. OVERHEAD TRAVELL. CRANE TO CARRY 15 000 KG., SPAN 21.4 M.

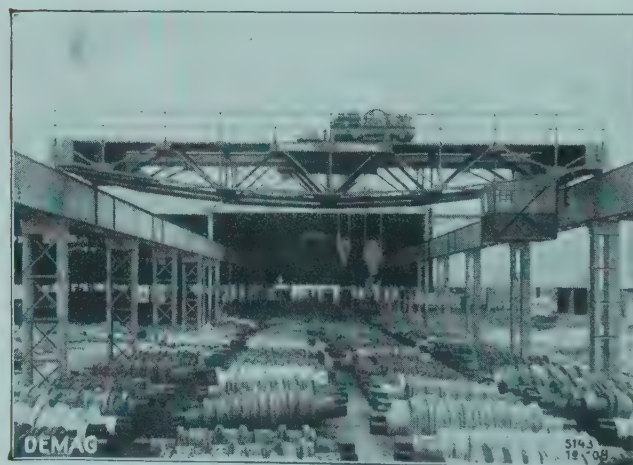
**A**s the crane works in the open air the crab is fitted with a closed cabin. The driver's cage is also weatherproof-lined. The crane serves for transporting the rolls stored in the open yard. Delivered to the Deutsch-Luxemburgische Bergwerks- u. Hütten-Aktiengesellschaft, Differdingen (Luxemburg).

THREE MOTOR GANTRY CRANE



FOR HANDLING LARGE ROLLS

THREE MOTOR TRAVELLING CRANE



FOR TRANSPORTING ROLLS

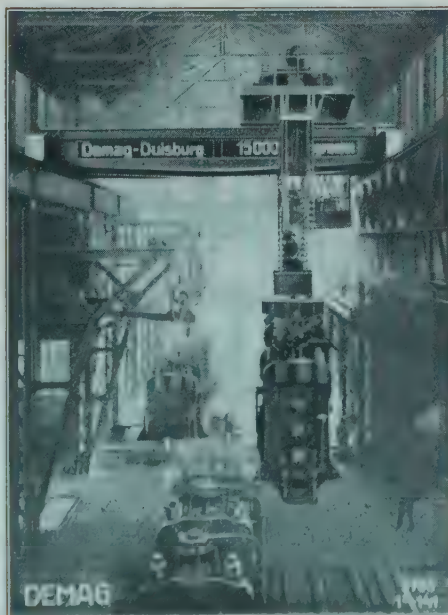




GANTRY CRANE TO CARRY 15 000 KILOS., 26.5 METRES OF CRAB TRACK

**T**his crane also serves for transporting rolls. As the siding runs at right-angles to the length of the crane the platform has been made to protrude beyond the foremost portal, to enable the rolls to be loaded. Delivered to the Röchlinsche Eisen- und Stahlwerke, G. m. b. H., Völklingen, Saar.

Travelling crane for inter-changing housings completely erected.



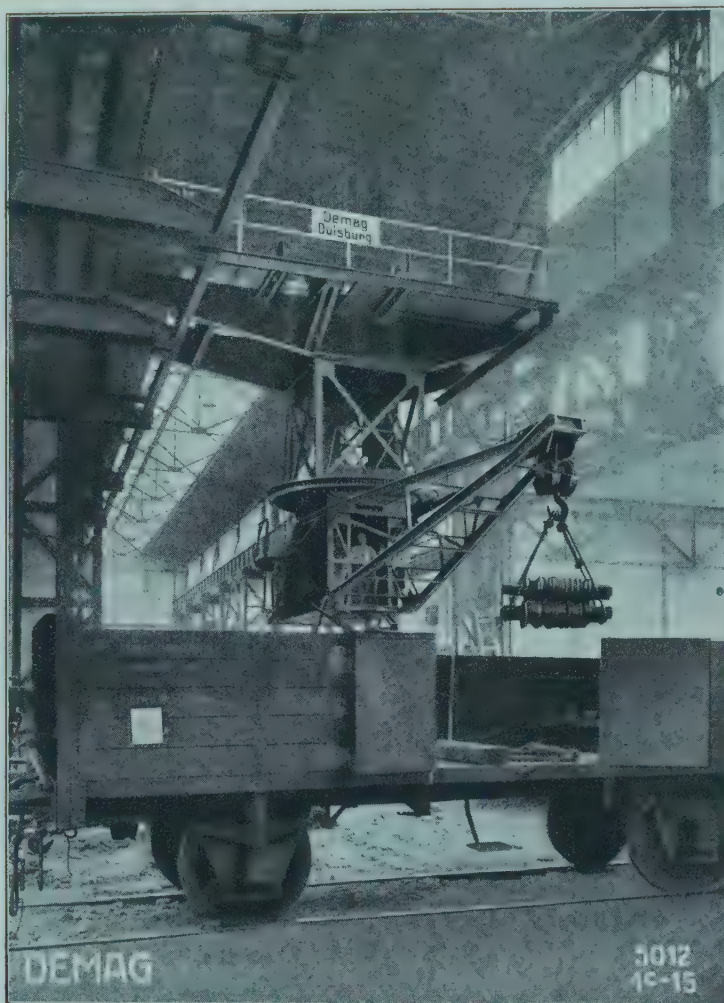
Such cranes can be used to advantage for small section iron mills.

Three motor travelling crane of 11 m. span and 150 000 kilos lifting capacity.

Delivered for the Rheinische Stahlwerke, A.-G., Duisburg-Meiderich.



## TRAVELLING CRANE WITH SLEWING JIB DISCHARGING ROLLS FROM THE RAILWAY TRUCK



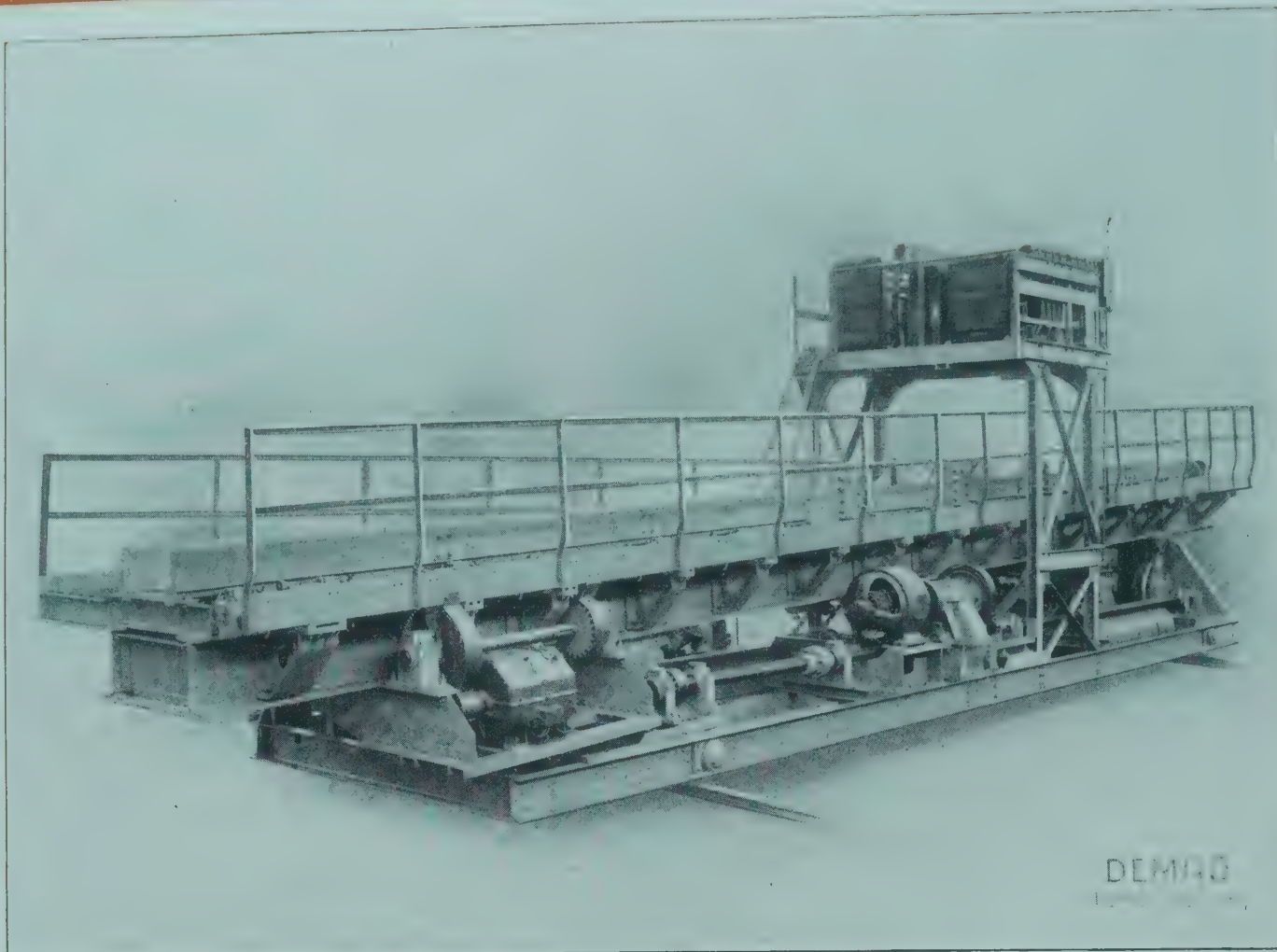
DELIVERED FOR THE FAÇONEISEN-  
WALZWERK L. MANNSTAEDT & CO.,  
A.-G., FRIEDRICH-WILHELMS-HÜTTE,  
TROISDORF nr. COLOGNE



# STATIONARY AND TRAVELLING ROLLER GEARS AND LIFTING TABLES

**T**o facilitate the feeding into the various grooves of the material to be rolled and to enable the finished product to be quickly transported, roller gears have long been in use, the rolls of which were formerly driven by steam, but in recent years entirely by electricity. For the two-high mills these roller gears are stationary or travelling, whereas for three-high mills, for feeding the material into the upper grooves or for transporting it from one housings to another, stationary and elevator roller gears, so-called oscillating and lifting tables, the two latter also travelling, are employed. The mechanical appliances hitherto almost exclusively used for serving three-high mills consisted of levers driven by steam or hydraulic power which, instead of the lifting tables and levers used now-a-days, did the above-mentioned work, requiring a large number of hands and causing great loss of time. On account of the cost of installation the roller gears and stationary levers before and behind the mill are now replaced by travelling ones wherever possible. Their application offers great advantages both from a technical and from an economical standpoint. Travelling roller gears and oscillating tables are also considerably lighter, because the width of the rollers may be much smaller than in stationary and crank roller gears. Moreover, the table being portable its tilting apparatus can be used for tilting the material at all the housings. When travelling tables with tilting apparatus are employed there is also a wide range of choice in the design of the rolls. This possibility and the unhindered locomotion of the tables in both directions gives such lifting tables a considerable advantage, especially for rolling mills with a comprehensive range of products. Another great advantage offered by the above-mentioned lifting tables is the patent Gasch feeder, the object of which is to enable the bar on leaving the upper pass to be fed quickly and accurately. In connection with this feeder there is a measuring appliance alongside the mill, along which an indicator connected with the table passes, so that the table can be accurately adjusted before the desired groove.

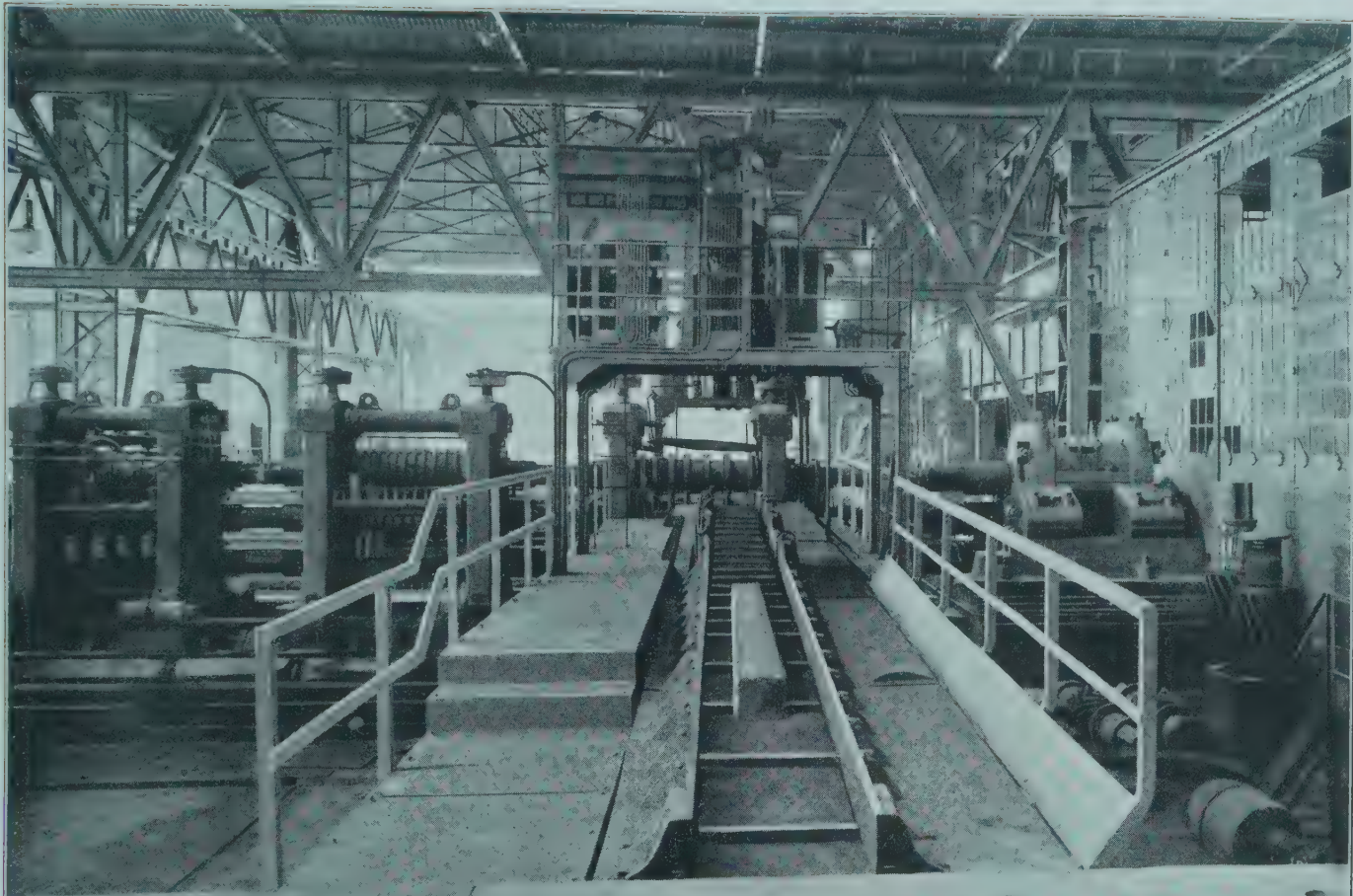




## ELECTRIC TRAVELLING LIFTING TABLE

**I**n our lifting tables the weight of the table is counterbalanced by a hydraulic pneumatic device which we have patented. At the lifting end the oscillation is automatically cut out. A special arrangement attended to by the operator enables him to alter the lift of the table within certain limits, so that it is possible to work with the table with absolute accuracy. Moreover, the table is fitted with devices to facilitate the correct adjustment of the lifting table before each groove after travelling, and patent automatic feeders attached to the roller gear place the material exactly in front of the groove in question. For both stationary and travelling lifting tables we make the tilting devices in such a way as to be set in motion at each lift of the table or controlled by the attendant.



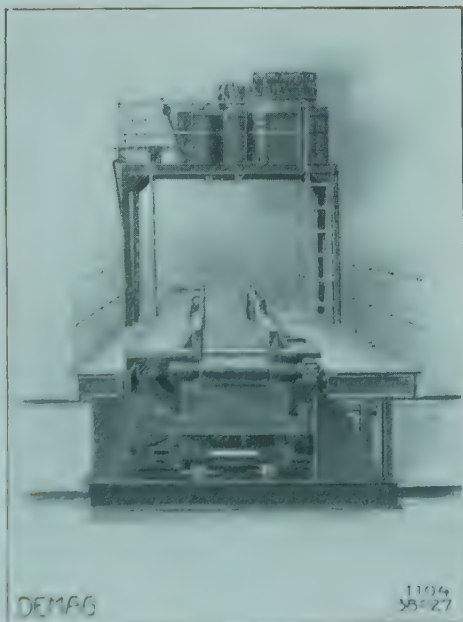


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ELECTRIC LIFTING TABLE WITH TILTING DEVICE – DEMAG PATENT –  
DELIVERED FOR THE DILLINGER HÜTTENWERKE, A.-G., DILLINGEN (SAAR)

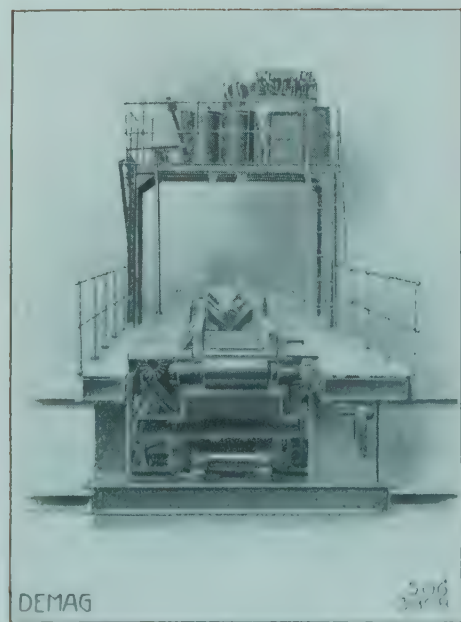
The lifting table has electric traversing and lifting gear and is balanced  
by compressed air. Two of these were delivered to the above firm.



DEMAG

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389-27

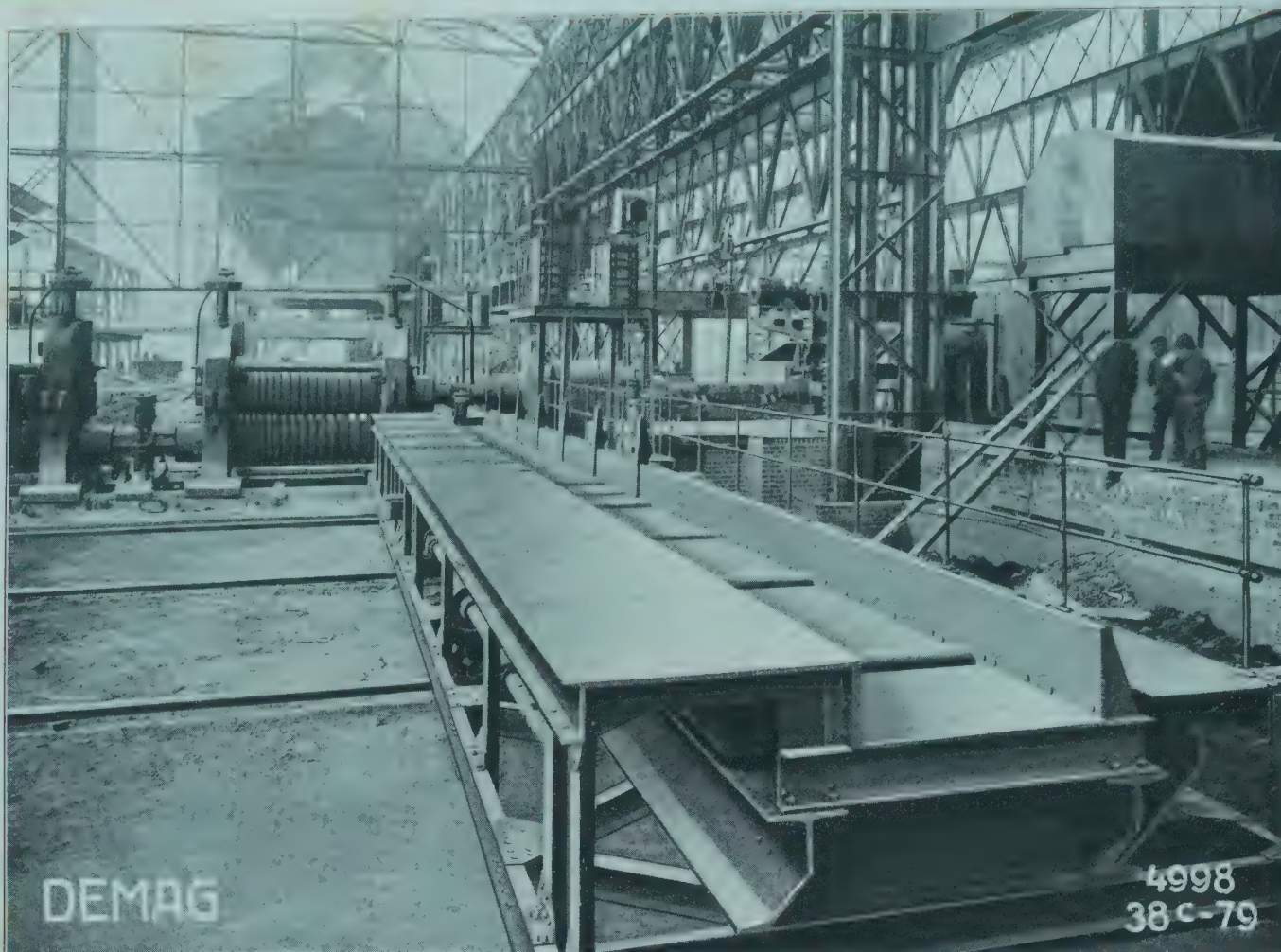
FRONT VIEW OF  
THE LIFTING  
TABLES WITH  
TILTING DEVICES



DEMAG

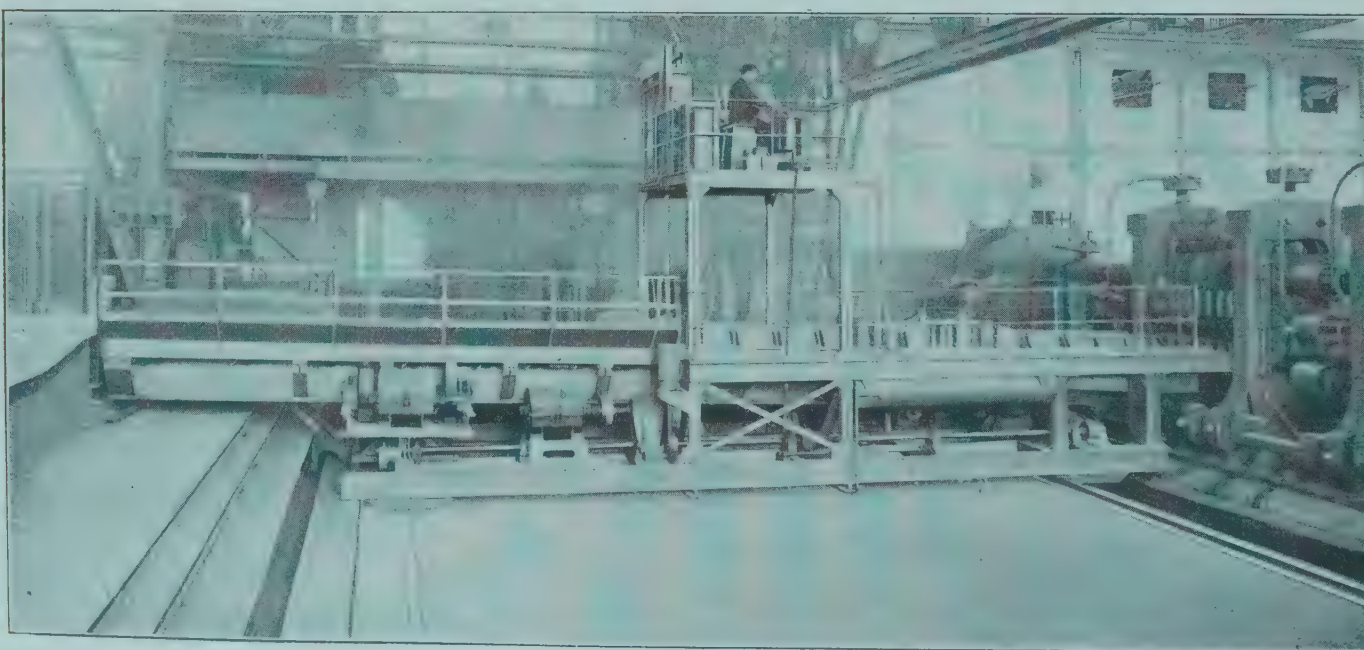
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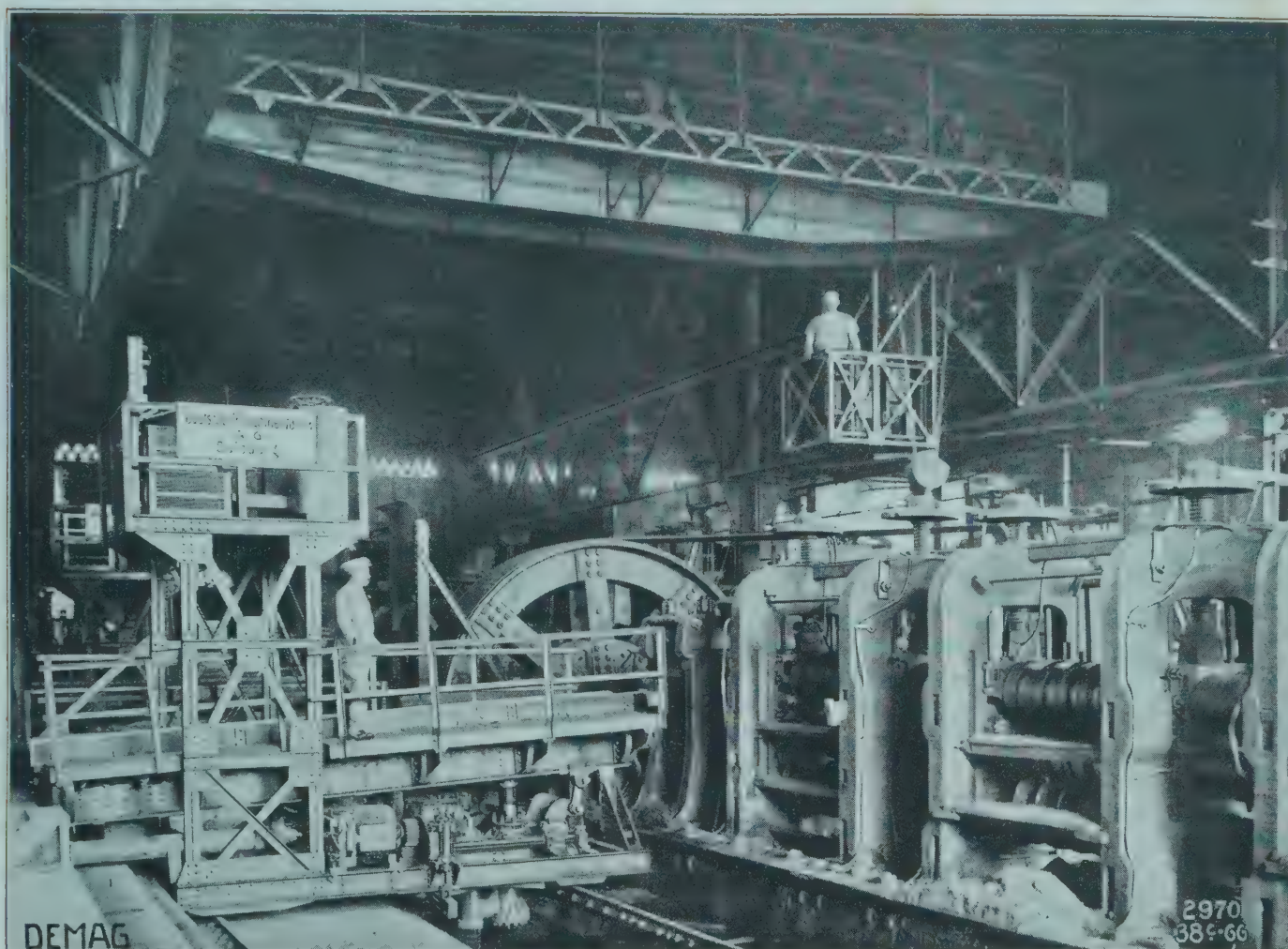


ELECTRIC TRAVELLING ROLLER GEAR / DELIVERED FOR THE SOCIÉTÉ ANONYME OUGRÉE MARIHAYE, DIVISION RODANGE (LUXEMBURG)

ELECTRIC TRAVELLING LIFTING TABLE / DELIVERED FOR THE DILLINGER HÜTTENWERKE, AKTIEN-GESELLSCHAFT, DILLINGEN (SAAR)

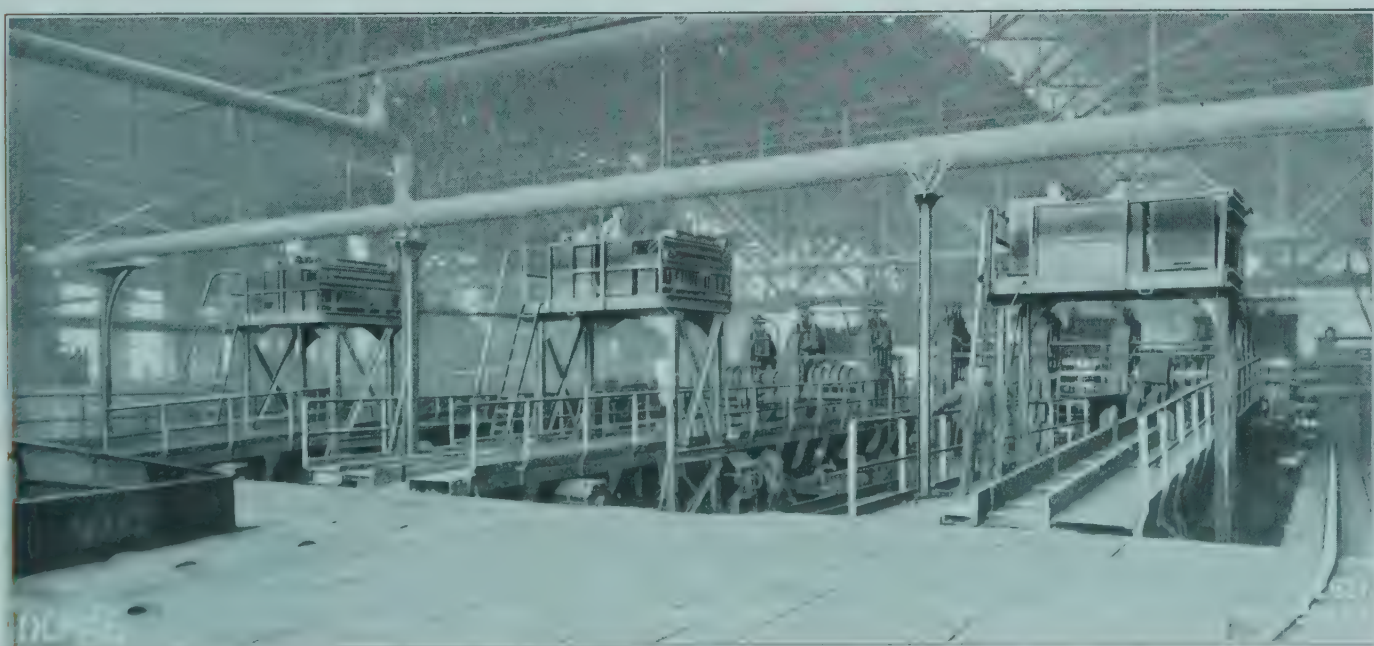




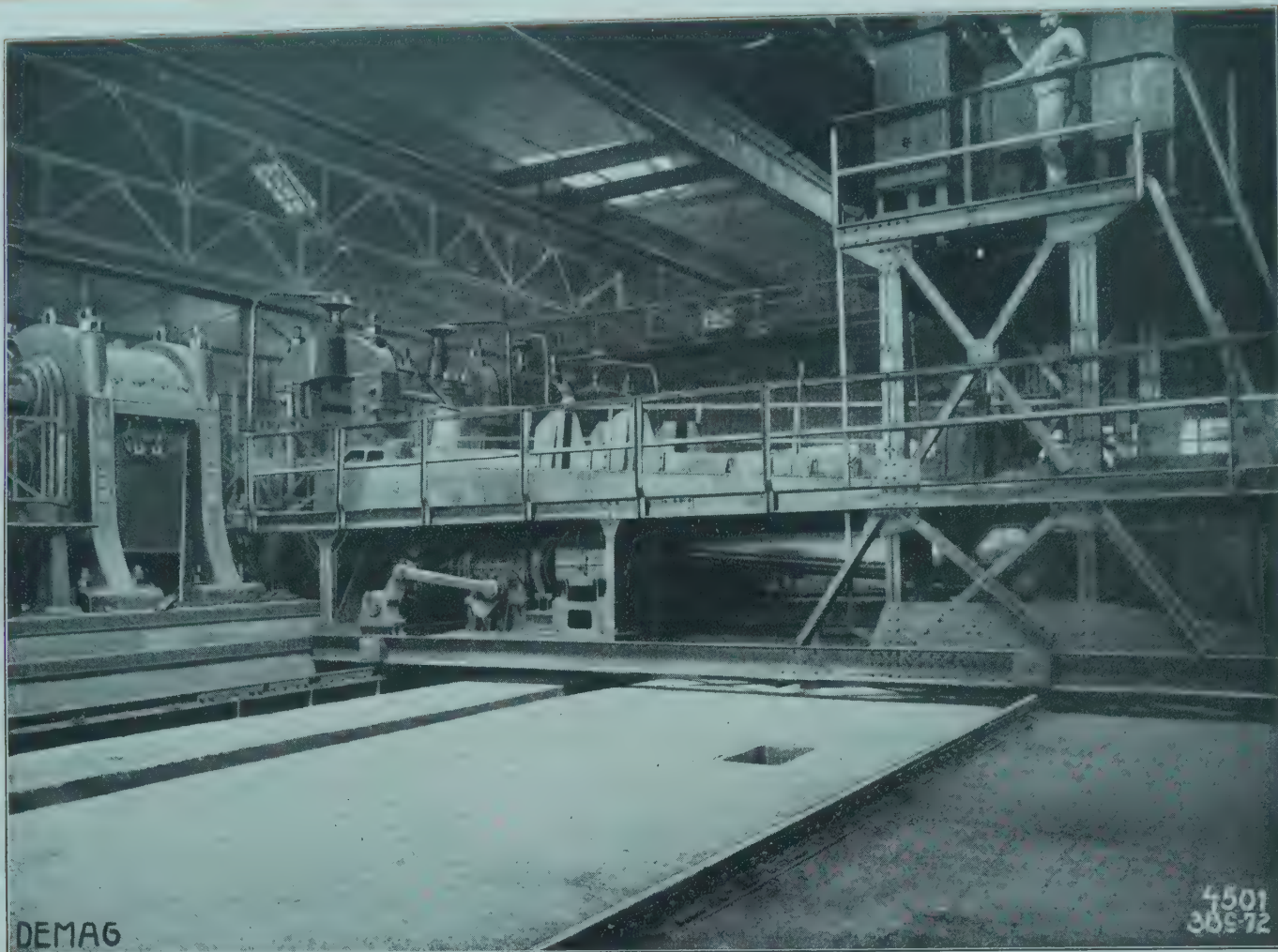


**ELECTRIC TRAVELLING LIFTING TABLE / DELIVERED FOR THE  
ACIAIERIE ITALIANE DELLE FERRIERE ITALIANE, BOLZANETO**

**THREE ELECTRIC TRAVELLING LIFTING TABLES / DELIVERED  
FOR GEBRÜDER STUMM, G. M. B. H., NEUNKIRCHEN (SAAR)**

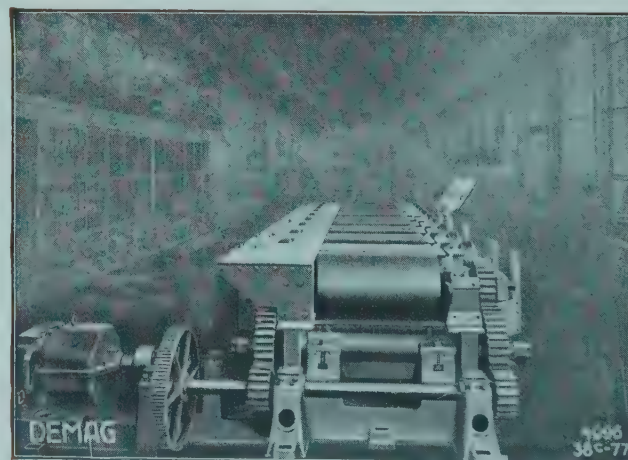
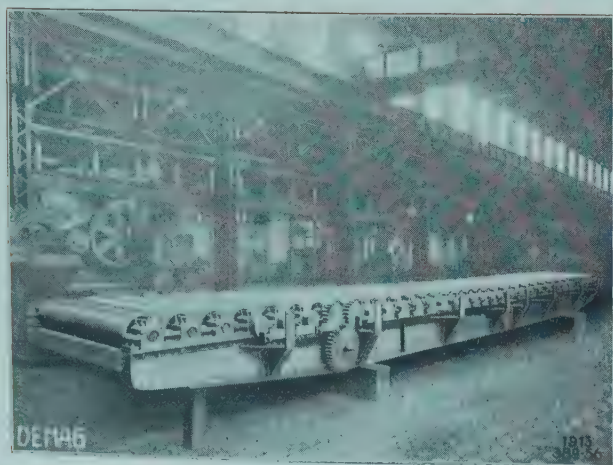




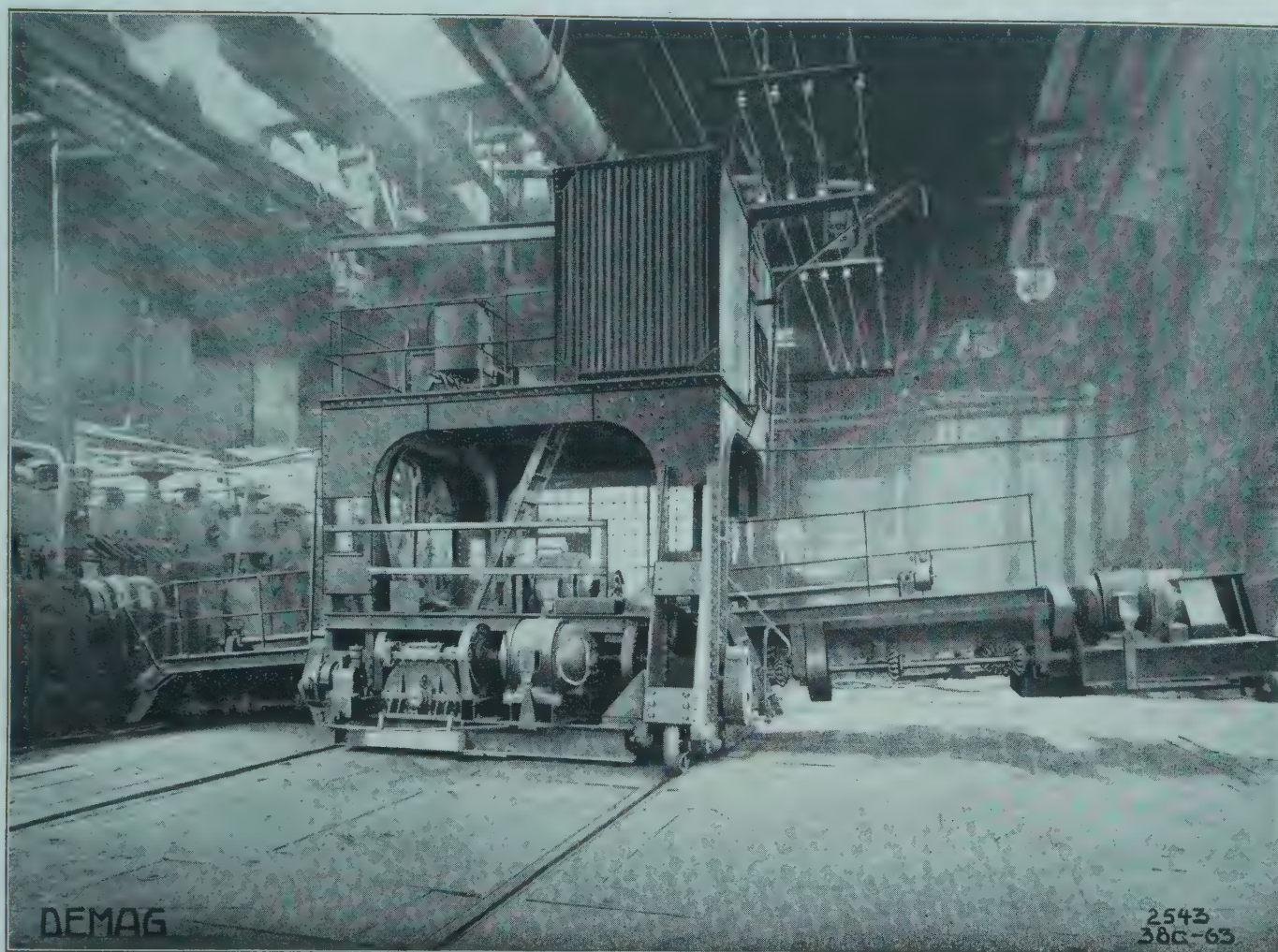


ELECTRIC TRAVELLING LIFTING TABLE / DELIVERED FOR THE EISENWERKS-GESELLSCHAFT "MAXIMILIANSHÜTTE", ROSENBERG (BAVARIA)

## STATIONARY OSCILLATING TABLES ERECTED IN OUR ERECTING SHOP

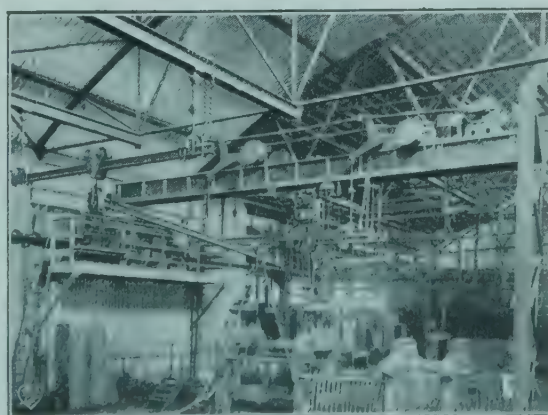






ELECTRIC TRAVELLING LIFTING TABLE / DELIVERED FOR  
THE OBERSCHLESISCHE EISENBAHNBEDARFS-AKTIEN-GESELL-  
SCHAFT, DEPARTMENT "FRIEDENSHÜTTE" nr. MORGENROTH

ELECTRIC POWER LEVER FOR THE 600 mm. THREE-HIGH ROUGHING  
MILL / DELIVERED FOR THE GEISWEIDER EISENWERKE  
AKTIEN-GESELLSCHAFT, GEISWEID





# THE FINISHING DEPARTMENT IN THE SECTION ROLLING MILLS

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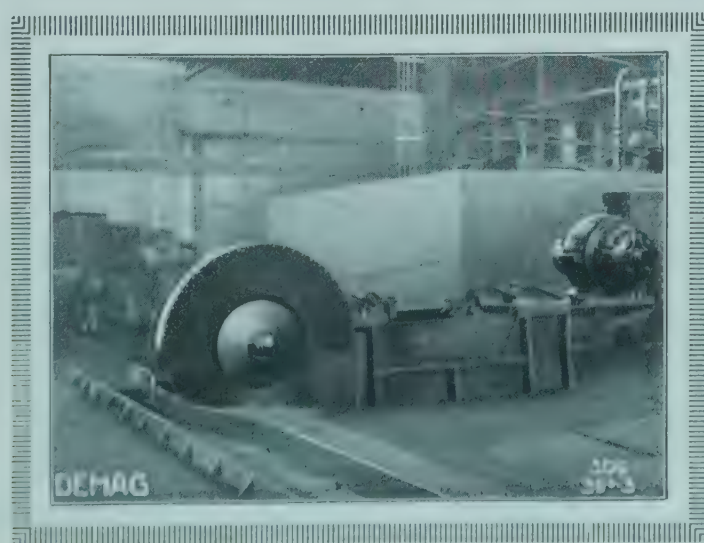
**A**n important part of rolling mills, and particularly of section rolling mills, is the finishing department. This is the workshop in which the rolled material is collected in order to go through the final processes on machines of the most varied descriptions before being dispatched from the works. In designing a finishing department for sections the following are the chief points to be taken into consideration: 1. The reduction of manual labour to a minimum for conveying the material and the attendance of the various machines, 2. To keep pace with the rolling process by avoiding all backward movement of the material, which would cause a loss of time, 3. A sufficiently large working area, in order to be able to take large quantities of material into the finishing shop in case of stoppage of the finishing process, 4. The possibility of easy and quick transport of the material from one finishing machine to another or from one cooling bed to another. For the fulfilment of these requirements various conveying devices are necessary, such as cranes, roller gears, skids etc., as well as special machines adapted to suit the form and production of the material to be finished, and these differ again according to local circumstances. The finishing machines themselves may be divided into three main groups, namely, 1. those which cut the material, such as saws and shears, 2. straightening machines, such as roller straightening machines and straightening presses, and 3. machines which serve for finishing off the material, such as scraping machines, drilling, milling and punching machines, sleeper capping and punching machines etc. Our finishing machines for all purposes and for all sorts of sections are mostly fitted for electric drive and are noted for their highly substantial up-to-date construction and accurate workmanship. Besides the machines mentioned above we also construct all other auxiliary and finishing machines, as well as all conveying appliances for rolling mills. The following pages contain illustrations of a few of the above-mentioned finishing machines, besides which we draw attention to our special pamphlets.





# TRANSPORT ROLLER GEARS, SKIDS AND SAWS FOR THE 850 mm. RAIL MILL / DELIVERED TO THE SOCIÉTÉ ANONYME OUGRÉE MARIHAYE, OUGRÉE (BELGIUM)

Sliding saw with electric drive. The feed is worked by hydraulic power. Guided by slides grasped on all sides by the foundation frame. The saw-blade is overhung and has a diameter of 1500 mm. Maximum cut a cross-section of  $300 \times 300$  mm. warm.





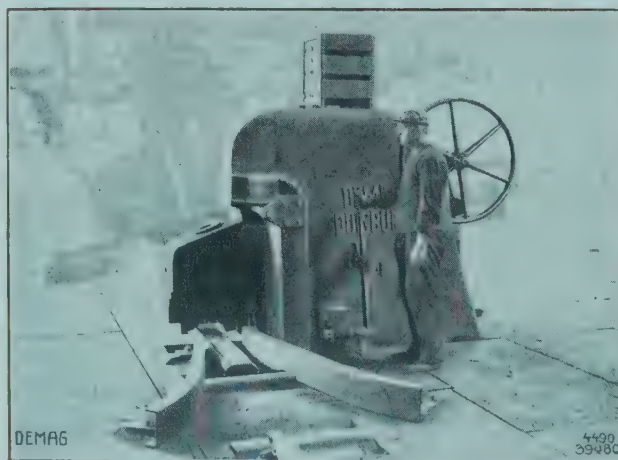


TRANSPORT ROLLER GEAR AND SLIDING SAW  
WITH ELECTRIC DRIVE AND HYDRAULIC FEED

## H O T I R O N S L I D I N G S A W

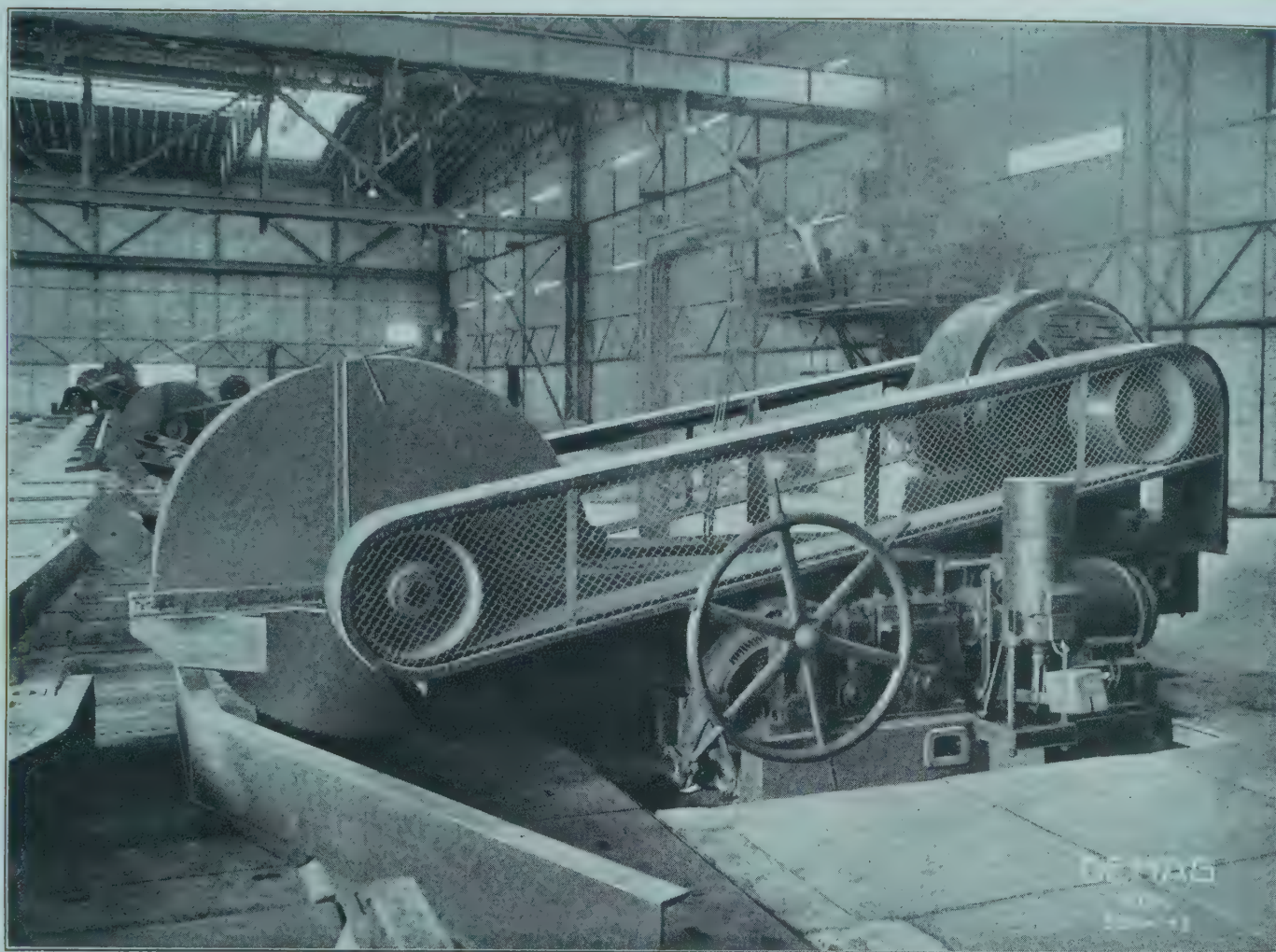
**T**his saw is intended for cutting sections and rails. The feed is hydraulic, the pressure water being supplied by a turbine pump erected on the slide. The pump is run from the saw motor by belting. Delivered to the Adolf-Emil-Hütte in Esch (Luxemburg).

This shearing machine is powerful enough to cut double sleepers. The bottom shear blade cuts upward, the top shear blade lies in a sledge which can be drawn back into the



housings, so that the track of the roller gear lies quite free. "P H O E N I X" Aktien-Gesellschaft für Bergbau- und Hüttenbetrieb, Hoerde, Westphalia.





ELECTRIC SLIDING SAW WITH ELECTRIC FEED  
DELIVERED FOR A BIG RHENISH STEEL WORKS

## H O T I R O N S L I D I N G S A W

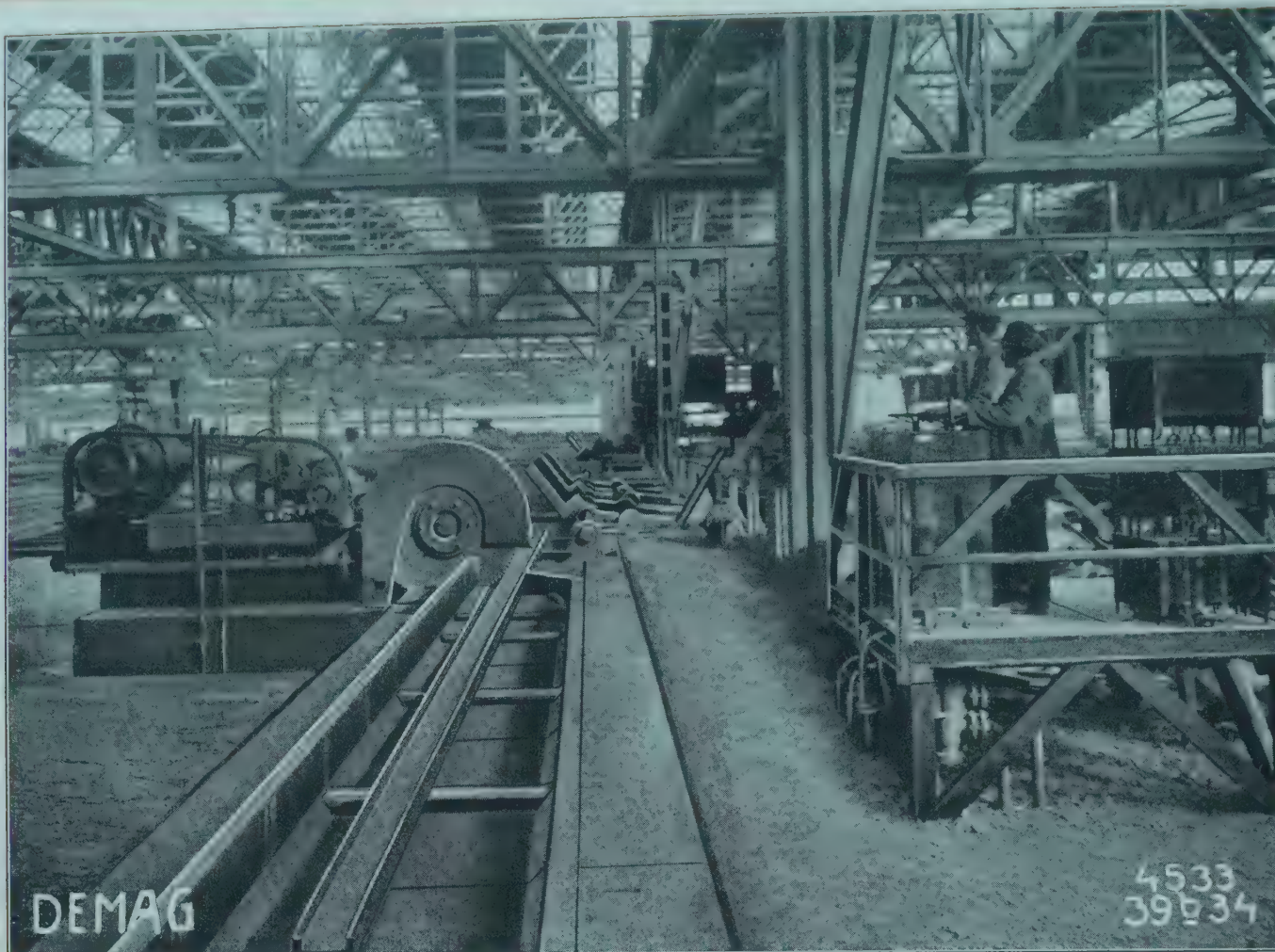
**T**he saw-blade is 1600 mm. in diameter and is driven by belt transmission from a motor standing on the sledge. The feed is also electric and is effected by a special motor. In addition to this the machine is fitted with hand feed for use in case of need. Delivered to a big steel works on the Lower Rhine.

The saw is intended for hot material up to 200 mm. square, and is erected between two roller gears in such a way as to leave a passage 1.6 metres



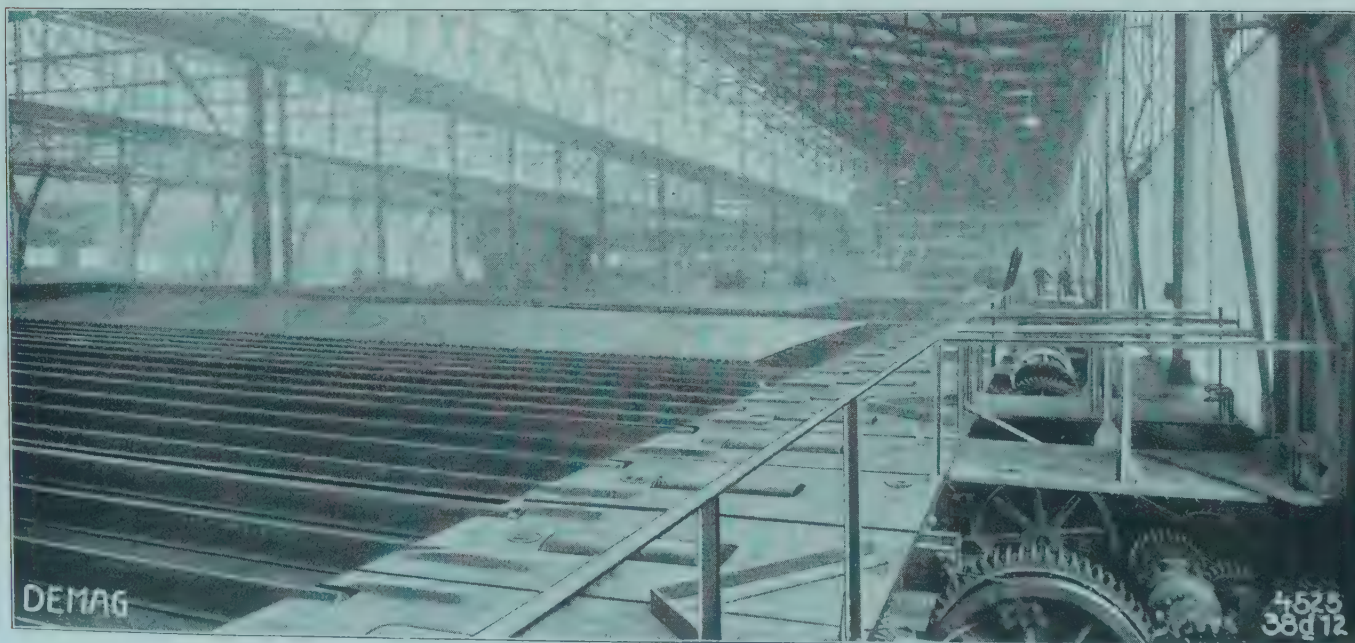
high beneath the bed. The saw was therefore fitted with an inclined sledge. Delivered for the Ungarische Staats-eisenbahn in Resicza ..... (Hungary). .....



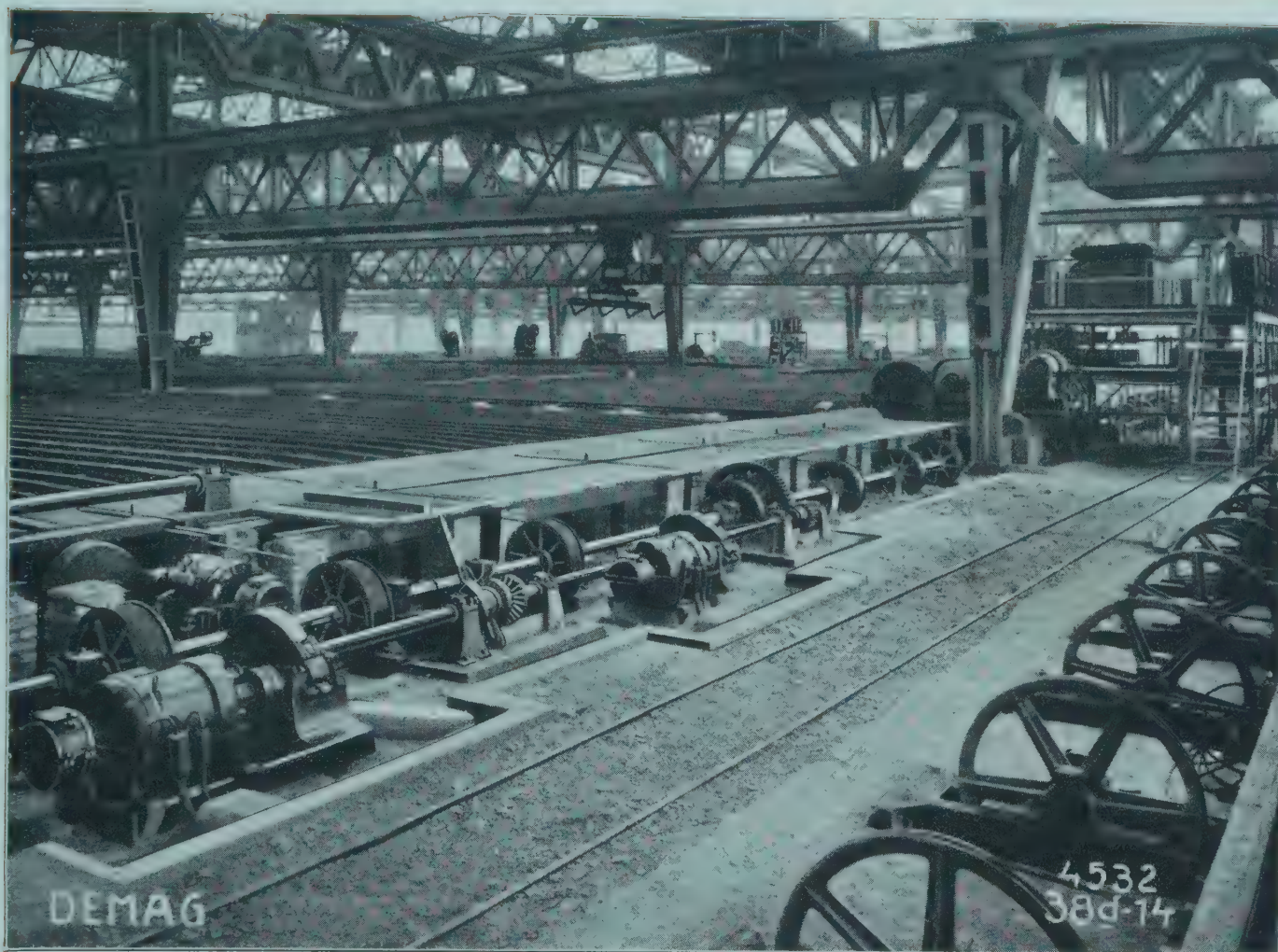


TRANSPORT ROLLER GEAR AND ELECTRIC SLIDING SAW / DELIVERED FOR THE GELSENKIRCHENER BERGWERKS-AKTIENGESELLSCHAFT DEPARTMENT: ADOLF-EMIL-HÜTTE, ESCH AN DER ALZETTE (LUXEMBURG)

HOT BANK FOR THE 850 mm. THREE - HIGH RAIL AND GIRDER MILL / DELIVERED TO A BIG RHENISH STEEL WORKS







HOT BANK AND SKID FOR THE 750 mm. THREE-HIGH MILL / DELIVERED FOR THE GELSENKIRCHENER BERGWERKS-AKTIENGESELLSCHAFT DEPARTMENT: ADOLF-EMIL-HÜTTE, ESCH AN DER ALZETTE (LUXEMBURG)

TRANSPORT ROLLER GEAR WITH TWO ELECTRIC SLIDING SAWS / DELIVERED FOR THE SOCIÉTÉ ANONYME D'ATHUS GRIVEGNÉE, ATHUS (BELGIUM)







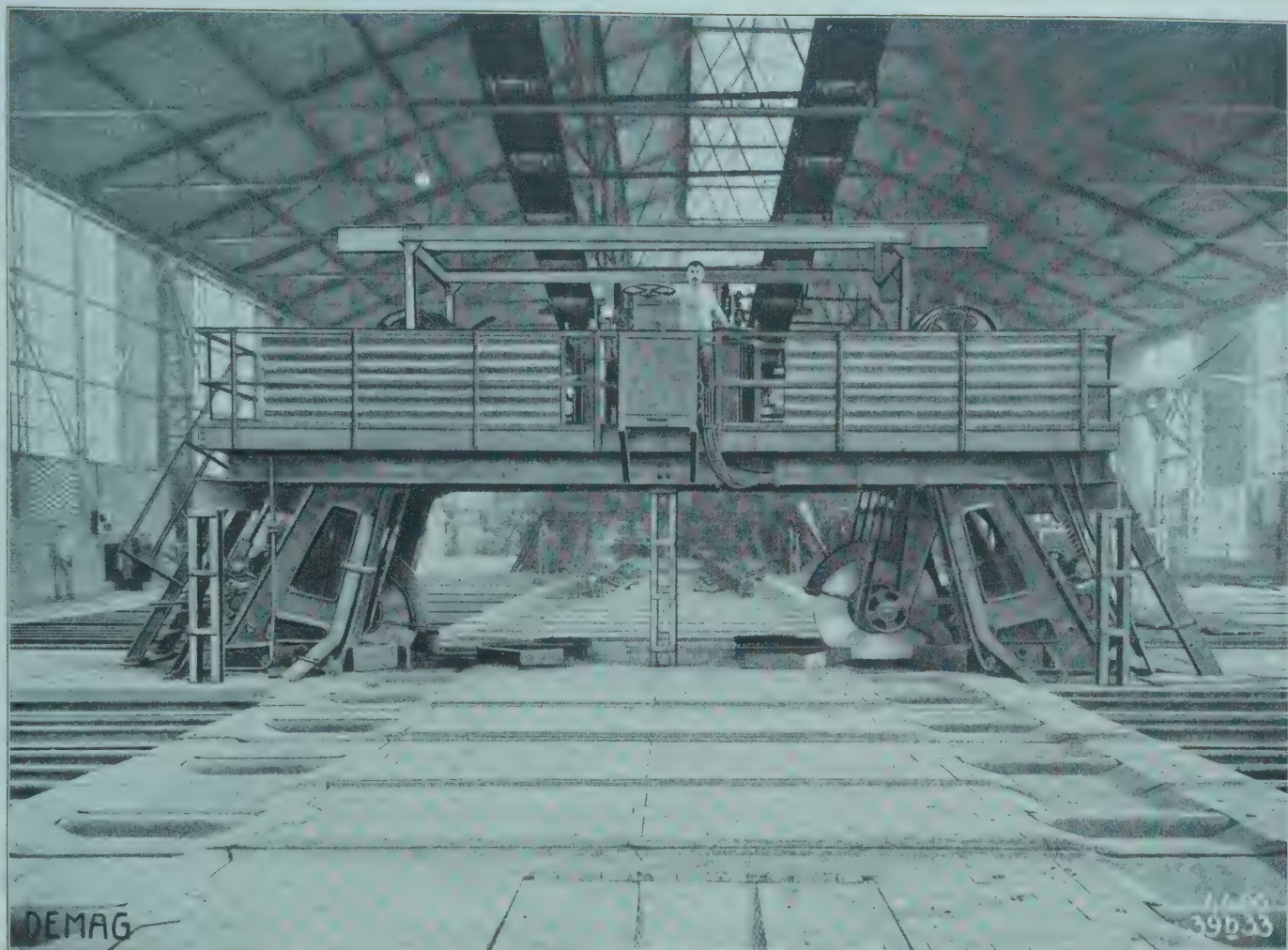
HOT BANK WITH FOUR PENDULUM SAWS / DELIVERED FOR THE RÜMELINGER UND ST. INGBERTER HOCHÖFEN UND STAHLWERKE AKTIENGESELLSCHAFT, ST. INGBERT



ELECTRIC PENDULUM SAW WITH HAND FEED AND MOTOR ERECTED ON THE PENDULUM

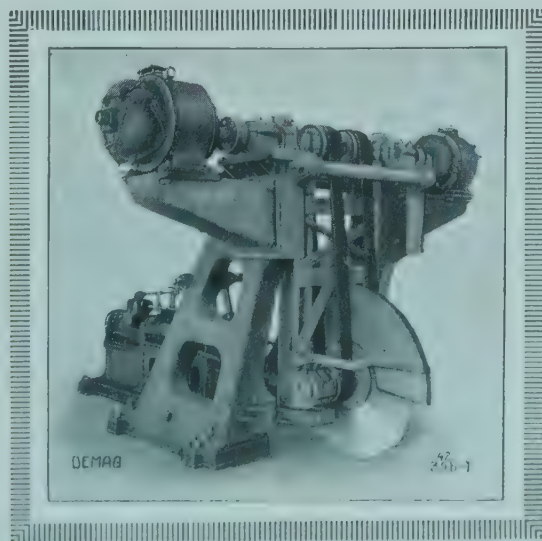
DELIVERED FOR A BIG RUSSIAN STEEL WORKS



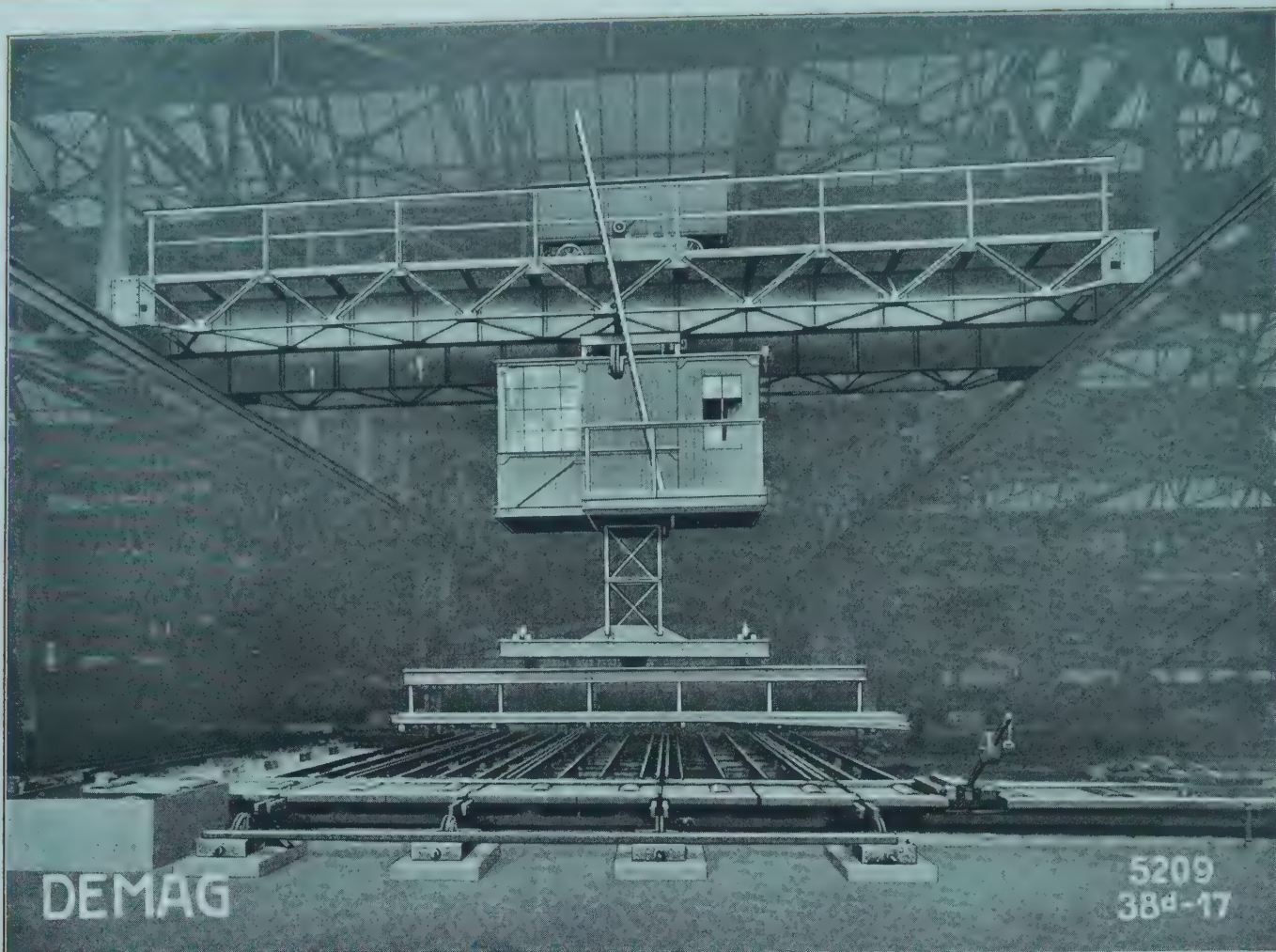


TWO ELECTRIC PENDULUM SAWS / DELIVERED FOR THE  
RÜMELINGER UND ST. INGBERTER HOCHÖFEN UND  
STAHLWERKE AKTIENGESELLSCHAFT, ST. INGBERT

ELECTRIC PENDULUM SAW WITH DOUBLE DRIVE BY TWO MOTORS.  
DIAMETER OF BLADE 1600 mm. FEED WORKED  
BY STEAM CYLINDER



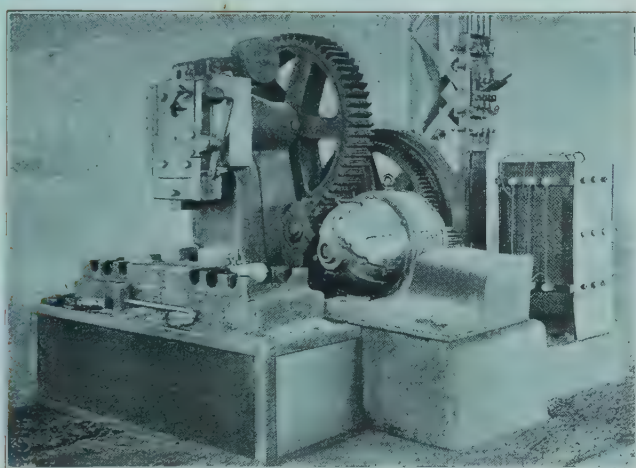
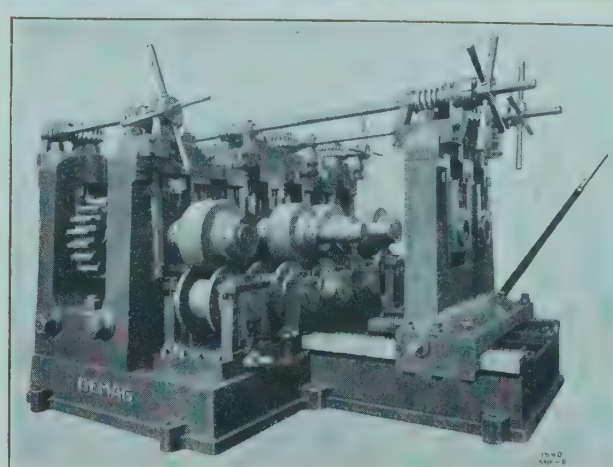
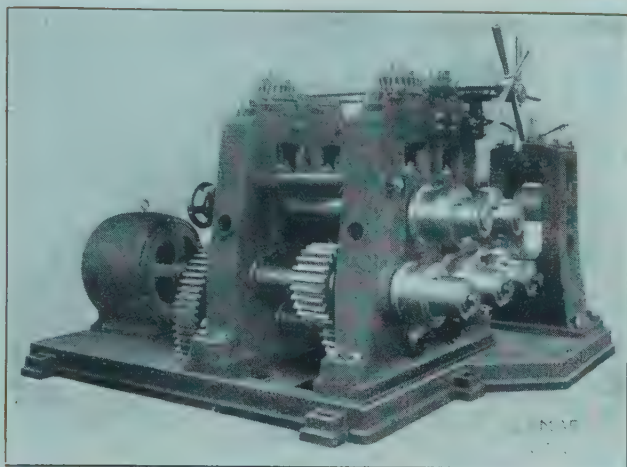




TRANSPORT ROLLER GEAR, HOT BANK AND CLAW CRANE  
DELIVERED FOR THE GELSENKIRCHENER BERGWERKS-A.-G.,  
DEPT.: ADOLF-EMIL-HÜTTE, ESCH A. D. ALZETTE (LUXEMBURG)

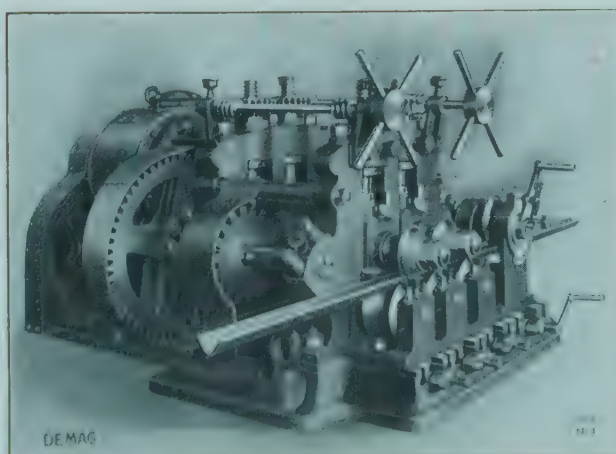
**A**fter having been cut to definite lengths by the saws or the shears the rolled material passes from the transport roller gear to the hot bank. From there it is taken by a claw crane to the actual finishing machines, the straightening, drilling and milling machines etc., to be finished off. In the following pages we give a few illustrations of finishing machines, large numbers of which we have already delivered to various steel works both at home and abroad. Furthermore we beg to call attention to our special pamphlets on these machines.





The two upper illustrations depict a roller straightening machine for pit rails, the rolls of which are hung, and a straightening machine for I and L-iron up to 300 mm. in height, with sliding standard. The two lower illustrations show a small electric driven straightening press for I and L-iron and a double straightening press for I girders up to a height of 550 mm.

Small angle  
iron straightening  
machine for  
angles of 60°.

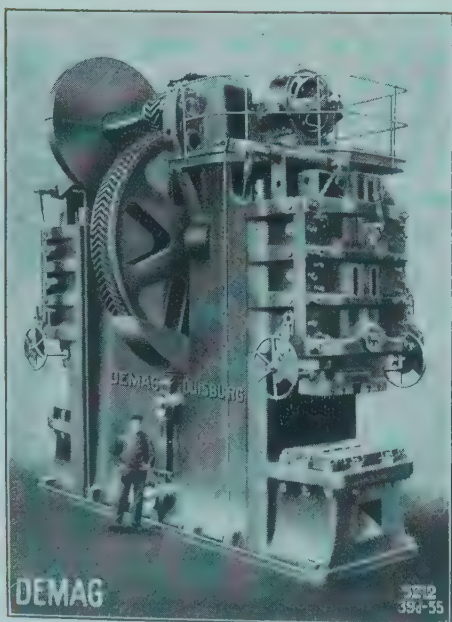


All machines  
illustrated  
are driven by  
electricity.

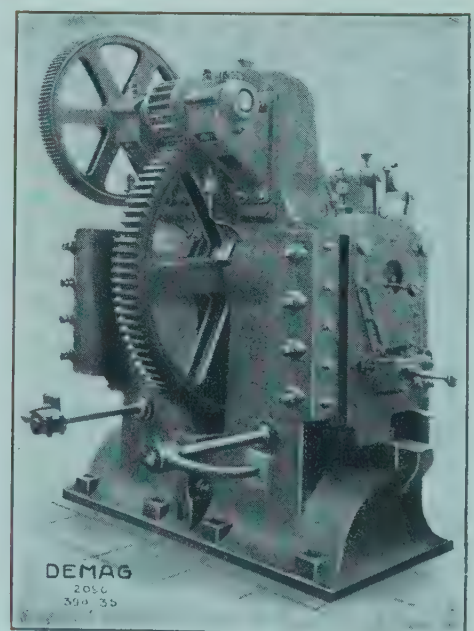




FINISHING HALL OF A ROUGHING MILL WITH ELECTRIC CLAW CRANE TO CARRY 4000 KILOS



HEAVY ELECTRIC PUNCHING MACHINE FOR A PRESSURE OF 750 000 KILOS.



ELECTRIC DOUBLE SHEARING MACHINE FOR ROUND AND SQUARE IRON.



# THE LOADING PLACE FOR SECTIONS

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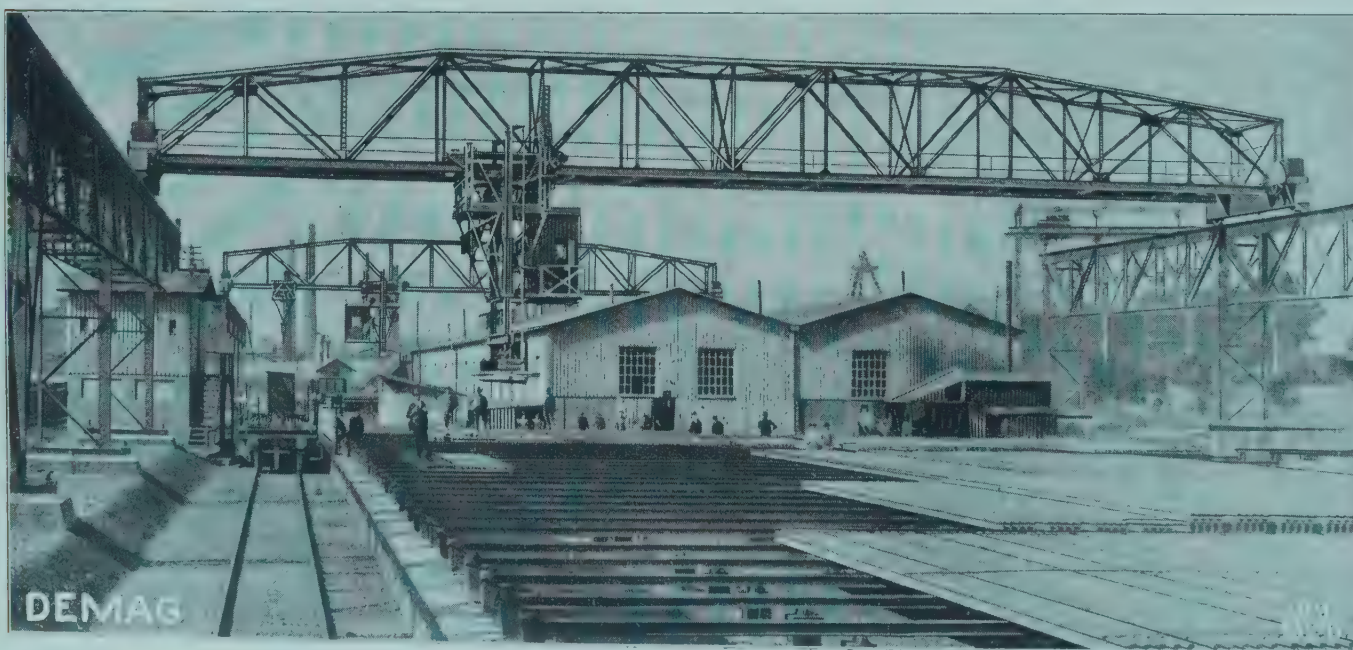
**T**o enable the finished bars to be piled up in the storeyard and the material to be conveyed quickly and without interruption the equipment of the storeyards and the halls of the rolling mills with efficient lifting devices is indispensable. The cranes designed and built by us for loading purposes satisfy to perfection all requirements. With a rotary lifting gear or claws the material can be taken up or deposited in any desired position. There is no need of hands in the storeyard to put the material into suitable heaps such as the hurdles which we build, as it can be taken up and deposited simply by the control of the claws by the crane attendant. The cranes working with lifting magnets in particular have proved very advantageous for facilitating the loading business, and to this kind of crane we have devoted special care and attention. Our lifting magnets are the most convenient and cheapest transporting means for rolled iron and plates as well as for other materials. When working with lifting magnets it is not necessary to give the material to be transported a special position. No particular care need be taken to have the transporting devices capable of being brought beneath or round the material to be forwarded, as the magnets also grasp plates and rolled iron piled up in close proximity to each other. Safety devices brought automatically or by the crane operator under the material hanging on the magnets prevent it from falling off in case of any unintentional interruption of the current. Where various kinds of rolled iron are to be collected in the storeyard for one order our cranes, which are fitted not only with claws but also with tongs or magnets, render valuable service. It being naturally impossible to give a detailed description of all the cranes built by us in the limited space at our disposal in this catalogue we request our readers to ask for our well illustrated special pamphlets, which may be had free of charge on application.





MAGNET CRANE / DELIVERED FOR THE PHOENIX, AKTIENGESELLSCHAFT FÜR BERGBAU UND HÜTTENBETRIEB, DUISBURG-RUHRORT

TWO MAGNET CRANES WITH LIFTING CAPACITIES OF 5000 KILOS AND 7500 KILOS AND SPAN OF 41 METRES / DELIVERED FOR THE DILLINGER HÜTTENWERKE, AKTIEN-GESELLSCHAFT, DILLINGEN AN DER SAAR







GIRDER LOADING CRANE WITH LIFTING MAGNETS AND ROTARY LIFTING GEAR / DELIVERED FOR THE WESTFÄLISCHE STAHLWERKE, BOCHUM

GIRDER LOADING CRANE WITH A SPAN OF 61.5 METRES AND A LIFTING CAPACITY OF 5000 KILOS / DELIVERED FOR THE VEREINIGTE HÜTTENWERKE BURBACH-EICH-DÜDELINGEN, DEPT. DÜDELINGEN (LUXEMBURG)







ELECTRIC SLEEPER LOADING CRANE / DELIVERED FOR THE  
GELSENKIRCHENER BERGWERKS-AKTIEN-GESELLSCHAFT, DEPT.:  
ADOLF-EMIL-HÜTTE, ESCH AN DER ALZETTE (LUXEMBURG)

OVERHEAD TRAVELLING CRANE  
WITH SLEWING JIB



DELIVERED FOR THE VEREIN. HÜTTEN-  
WERKE BURBACH-EICH-DÜDELINGEN

LOADING CRANE  
FOR BAR IRON



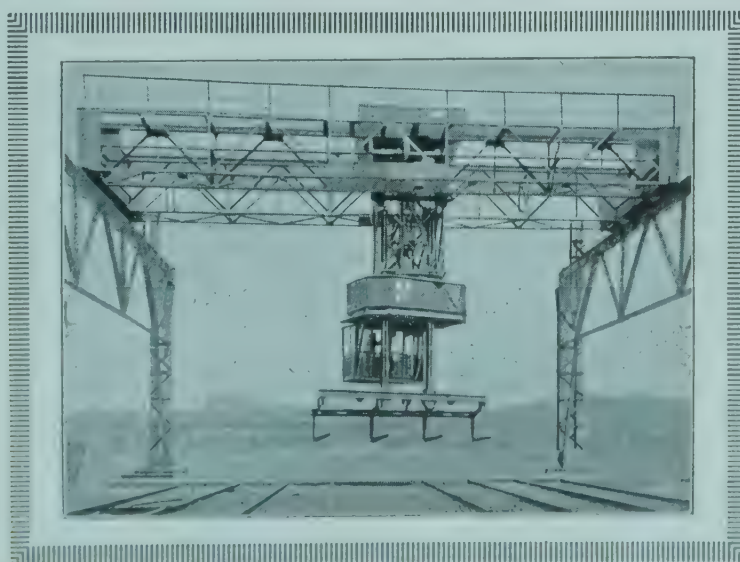
DELIVERED FOR THE RHEINISCHE  
STAHLWERKE DUISBURG-MEIDERICH





# CLAW CRANE WITH ROTARY LIFTING GEAR / DELIVERED FOR VEREINIGTE STAHLWERKE VAN DER ZYPEN UND WISSENER EISENHÜTTEN-AKTIEN-GESELLSCHAFT, COLOGNE-DEUTZ

Electric claw crane with rotary lifting gear for transporting rails and bar iron. The crane has a lifting capacity of 5000 kilos and a span of 16.7 metres. Delivered for the Dillinger Hüttenwerke Aktien-Gesellschaft, Dillingen (Saar).

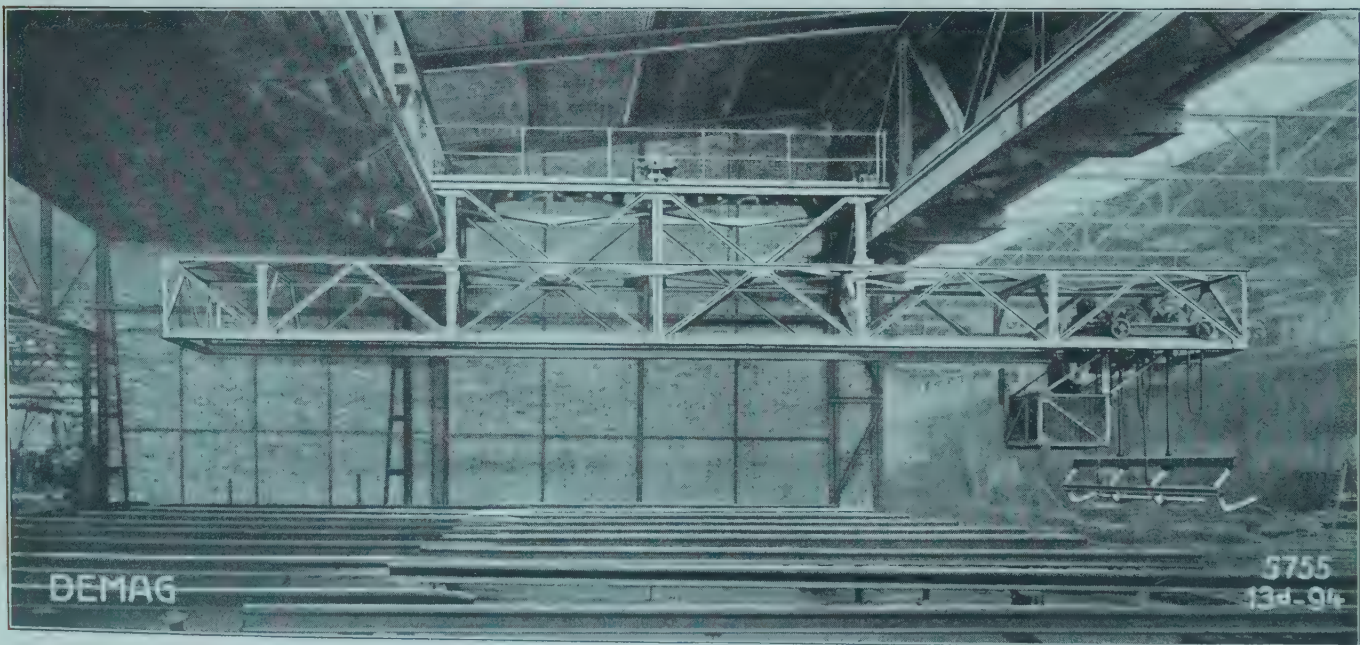






TWO GANTRY CRANES OF 7500 KILOS. LIFTING CAPACITY AND 41.5 m. SPAN FOR TRANSPORTING BAR IRON. / DELIV. FOR THE DEUTSCH-LUXEMBURG. BERGWERKS- UND HÜTTEN-AKTIENGESELLSCHAFT, DEPT.: DORTMUNDER UNION, DORTMUND

CLAW CRANE WITH FIXED JIB / DELIVERED FOR THE LOTHRINGER HÜTTENVEREIN AUMETZ-FRIEDE IN KNEUTTINGEN







TWO GANTRY CRANES OF 5000 KILOS LIFTING CAPACITY AND A SPAN OF 43.3 m. FOR LOADING BAR IRON / DELIVERED FOR THE RÖCHLINGSCHE EISEN- UND STAHLWERKE, G.M.B.H., VÖLKLINGEN AN DER SAAR

C L A W C R A N E S F O R L O A D I N G S E C T I O N S  
V E R E I N I G T E H Ü T T E N W E R K E B U R B A C H - E I C H - D Ü D E L I N G E N , D Ü D E L I N G E N







THREE BILLET TRANSPORTING CRANES WITH ROTARY GRAB FRAME / DELIVERED FOR PHÖENIX, AKTIENGESELLSCHAFT FÜR BERGBAU UND HÜTTENBETRIEB, DUISBURG-RUHRORT

NINE CLAW CRANES FOR LOADING PURPOSES IN THE BAR IRON STOREYARD OF THE VEREINIGTE HÜTTENWERKE BURBACH-EICH-DÜDELINGEN, BURBACHER HÜTTE, BURBACH







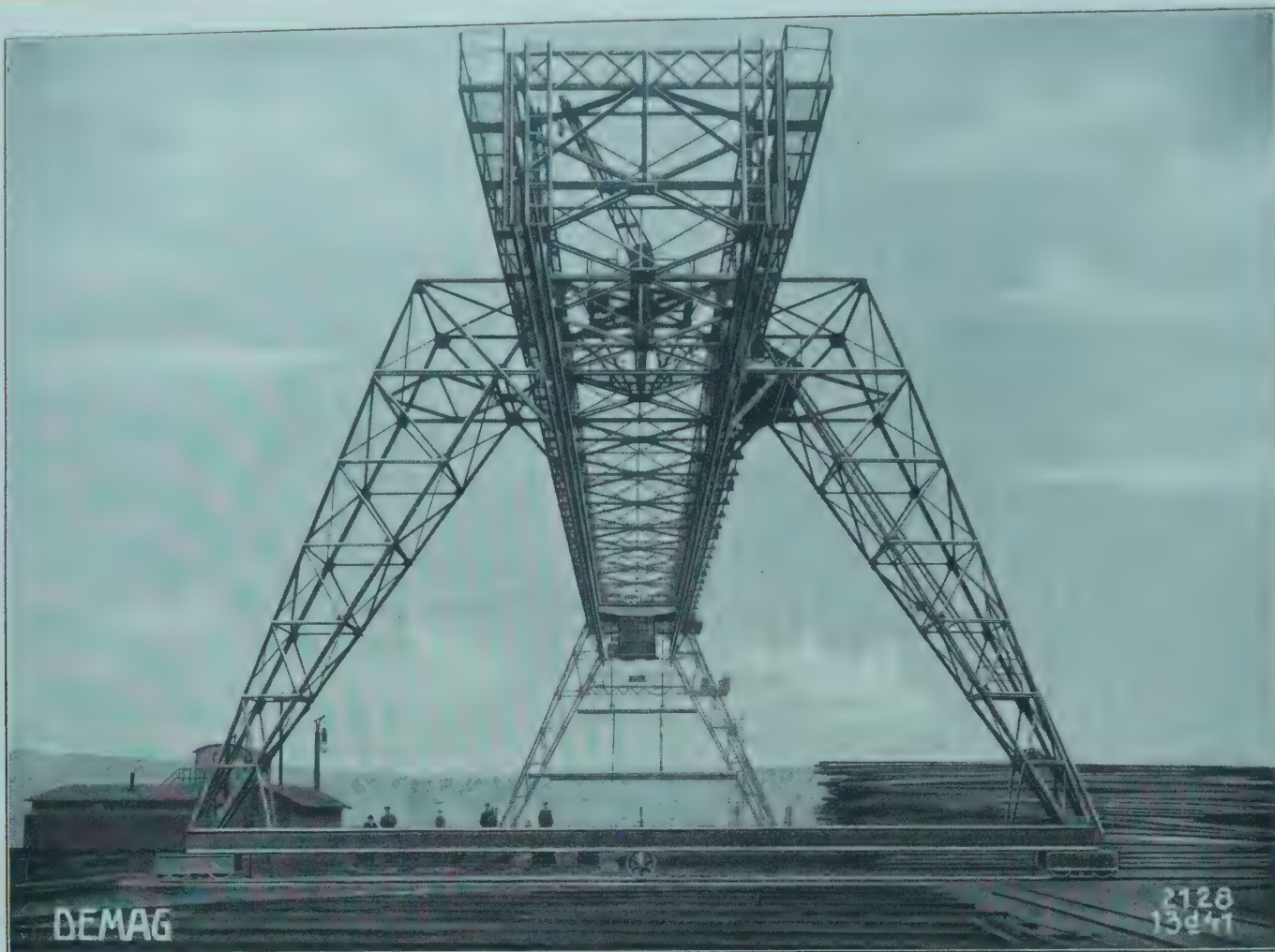
## TWO ELECTRIC LOADING CRANES FITTED WITH MAGNETS / DELIVERED FOR THE PEINER WALZWERK AKTIEN-GESELLSCHAFT, PEINE

Two electric loading cranes of 4000 kilos. lifting capacity and 44 m. span, for loading rails and bar iron. The cranes are fitted with Demag lifting magnets.

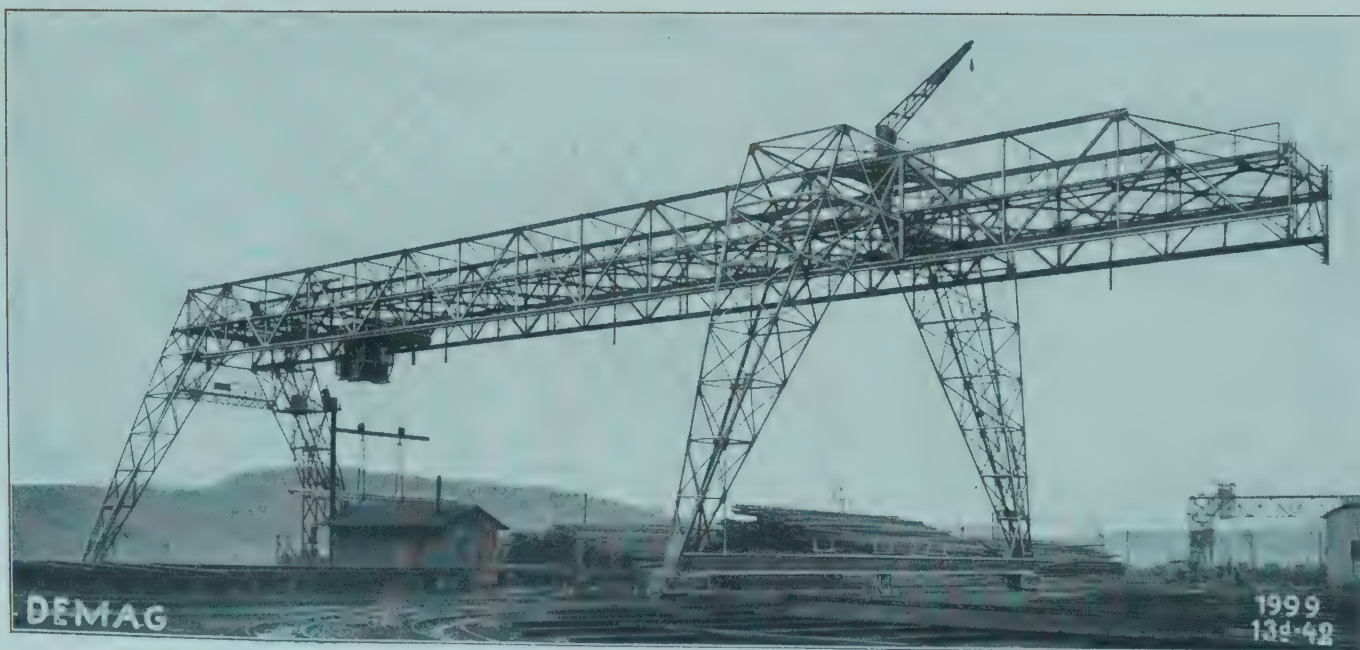
Delivered to the "Phoenix", Aktien-Gesellschaft für Bergbau und Hüttenbetrieb, Duisburg-Ruhrort.







**ELECTRIC GANTRY CRANE FOR LOADING PURPOSES**  
with a lifting capacity of 5000 kilos., 43.3 m. span and 15 m. radius. The upper illustration shows the end view and the lower one the side view. Deliver. for the Röchlingsche Eisen- u. Stahlwerke, G.m.b.H., Völklingen.





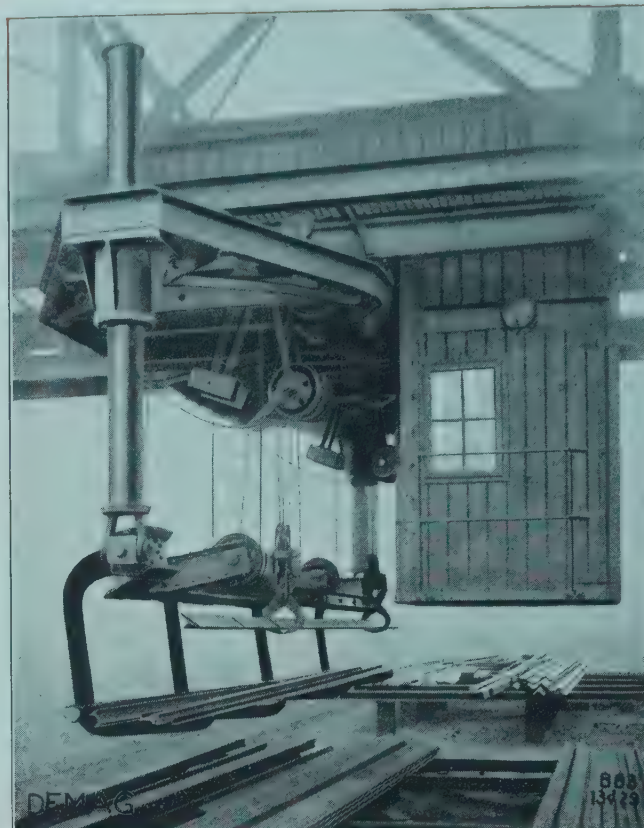


## ELECTRIC GANTRY CRANE FOR LOADING GIRDERS

Lifting capacity 3500 kilos., length 90 m. The lower illustration depicts an electric bar iron loading crane. Both cranes delivered to the Imperial Japanese Steel Works, Yawatamachi (Japan).



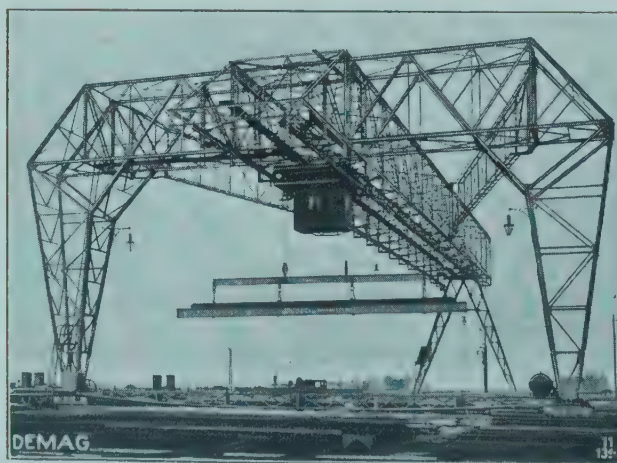




CRAB OF AN ELECTRIC TRAVELLING GANTRY  
CRANE FOR LOADING BAR IRON LIFTING  
CAPACITY OF THE CRAB 5000 KILOGRAMMES  
SPAN OF THE CRANE 26.5 METRES

**T**he crab is fitted with fixed tiltable claws and with oscillating tongs for loading the claws. / Delivered to the Deutsch-Luxemburgische Bergwerks- und Hütten-Aktien-Gesellschaft, Differdingen (Luxemburg).

Electric gantry  
crane for loading  
girders  
and bar iron



Delivered for  
Gebrüder Stumm,  
G. m. b. H.,  
Neunkirchen (Saar)





TWO ELECTRIC CLAW CRANES FOR LOADING PURPOSES EACH WITH A LIFTING CAPACITY OF 15 000 KILOS. AND A SPAN OF 24.4 m. / DELIVERED FOR THE LOTHRINGER HÜTTEN-VEREIN AUMETZ-FRIEDE, KNEUTTINGEN

**T**he part suspended beneath the crabs, which run within the cranes, carries four tiltable grabs and two grab tongs, all of which are controlled from the driver's stand. The long track is traversed by the cranes at the rate of 130 metres a minute.

Gantry crane  
for  
loading girders.  
Span 67 metres



Delivered for the  
Gewerkschaft  
Deutscher Kaiser,  
Bruckhausen.





ELECTRIC SECTION IRON LOADING CRANE WITH  
AUTOMATIC DISCHARGING DEVICE LIFTING  
CAPACITY 5000 KILOGRAMMES, SPAN 21.5 METRES

Steam crane of our standard type with adjustable jib, for trans-  
porting rolled iron. Besides lifting loads the crane  
also serves for shunting railway waggons.







BAR IRON LOADING CRANE FITTED WITH HORSE-SHOE MAGNETS / DELIVERED FOR THE SOCIÉTÉ ANONYME JOHN COCKERILL, SERAING (BELGIUM)

Electric rolled iron loading crane with suspended claws for taking up the rolled material. Delivered for the Compagnie des Forges et Aciéries d'Homécourt, Meurthe-et-Moselle.





# MAGNET CRANE



FOR TRANSPORTING HEAVY ARTICLES  
DELIVERED FOR THE POUTILOV WORKS  
IN ST. PETERSBURG





## MEDIUM AND SMALL BAR ROLLING MILL



**F**or rolling small sections, such as small I-iron, channel iron, transoms, round, square, flat and hoop iron etc. medium and small section rolling mills are required, either as three-high mills or double two high mills. On account of the smaller sections to be produced on them these rolling mills have rolls of a smaller diameter than in the girder mills, and also roll at a greater speed, since the long lengths of smaller cross-section can be cooled much more rapidly. The billets to be rolled in the medium and small section rolling mills generally pass through a cogging mill before coming to the finishing mill, or through a continuous cogging mill consisting of several housings, in which the billets are rolled down to a certain cross-section. After being thus reduced the bar is cut into several pieces by hot shears erected between the cogging mill and the finishing mill, and these pieces are then taken, without being reheated, to the finishing mill which consists of several housings. After being rolled in the finishing mill the material passes into a roller gear before which, in the case of the small section rolling mills, a revolving shearing machine is erected, which cuts the material to the proper lengths for the hot banks. In the case of medium section rolling mills one or more saws are built into the above-mentioned roller gears, to cut down the material rolled. When cut down it is taken to the hot banks, and when cooled down it is conducted to the finishing machines. Now-a-days the small section rolling mills are fitted with mechanical hot banks only, the bars being lifted from the roller gear and deposited on the rails of the hot bank by the ends of the oscillating gridwork built into the hot bank. At the end of this gridwork, i. e., in front of the roller gear for transporting the material away, there is generally a device passing through the whole of the hot bank for pushing off several sections at the same time onto the roller gear just mentioned. The roller gear then conveys the bars to the shearing machines, where they are cut to the required length, after which they are transferred to the storeyard by claw cranes.



## FROM THE INGOT AND BILLET STOREYARD TO THE MEDIUM AND SMALL SECTION MILLS

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**O**n reaching the storeyard from the blooming mill the ingots are piled up in rows as nearly as possible one above another. This work can be done both quickly and well by magnet cranes, which also convey the pile from the storeyard to the furnaces or to the ingot pushing devices. If the ingots are first piled up on a car and then conveyed to the ingot pushing devices the car generally serves also as the grid from which the ingot pushing device pushes the ingot into the furnace. In such cases the car is made so as to be capable of being raised or lowered, so that when the top layer of ingots has been pushed into the furnace the next layer may be raised to the height of the furnace doors. The car is raised by means of a hydraulic cylinder beneath the rails. This process can also be effected by electricity. Besides the ingot pushing devices, which are stationary or travelling, charging cranes or charging carriages running along the floor may be employed to advantage. These not only push the ingot into the furnace but also fetch it out again, besides which they usually convey the ingots from the furnace to the rolling mill. Charging cranes or carriages are worked by electricity and are adapted to all the required movements, such as gripping ingots, raising, lowering, turning and travelling. They therefore render it possible for the furnace plant and the rolling mill to work in cooperation even when the space at the disposal is unfavourable. For small concerns, or for those in which space does not allow of such cranes being erected, our electric capstans may also be used to advantage. Such capstans, the gearing of which is entirely underground, take up very little room, and if corner pulleys are used they can be employed for all kinds of traction work in the rolling mill.



# MAGNET CRANE



17 METER SPAN, 8000 KILOGRAMMES LIFTING CAPACITY  
DELIVERED FOR DE WENDEL'SCHE BERG- UND HÜTTEN-  
VERWALTUNG, ROSSLINGEN, KREIS DIEDENHOFEN

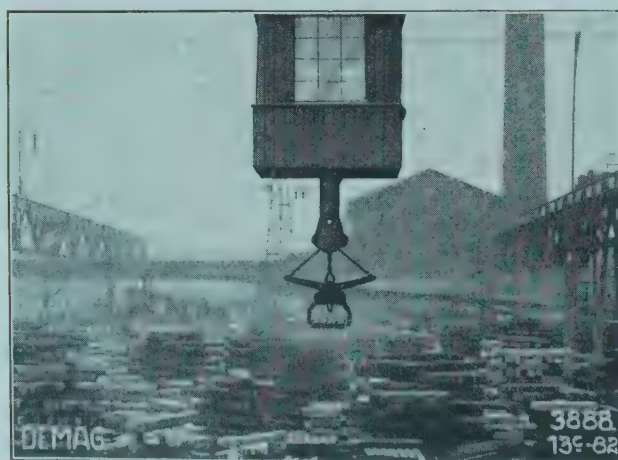




MAGNET CRANE / DELIVERED FOR THE WESTFÄLISCHE STAHLWERKE, AKTIEN-GESELLSCHAFT, BOCHUM

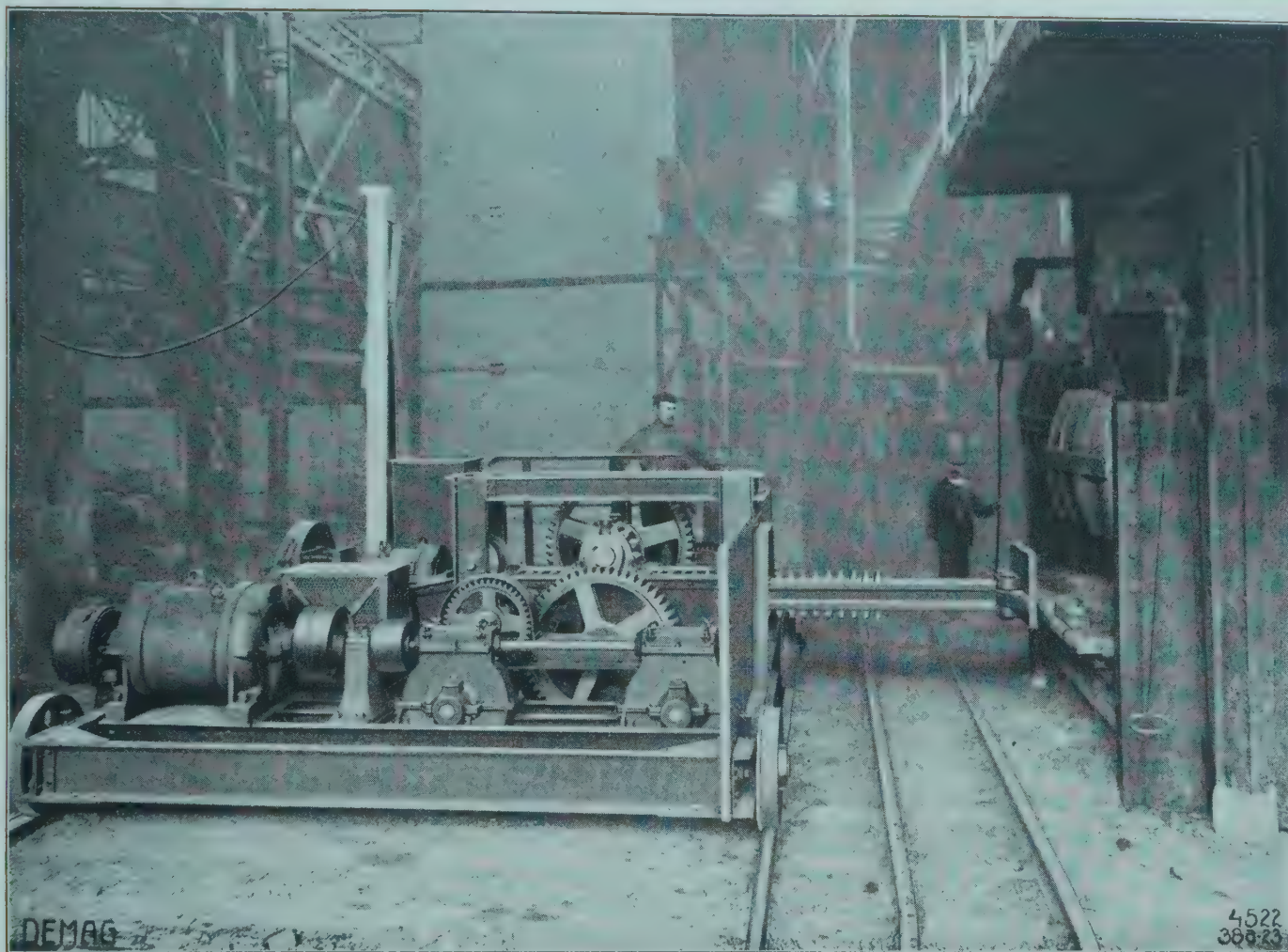
**T**he ingot storeyards are served by cranes with tongs, or more recently with magnets, which have a great lifting capacity and enable the piling of the ingots to be done simply, by gripping a whole layer of ingots at time and laying them crosswise, one layer upon the other. A similar system of working can be obtained in no other way, except with tongs which, as is shown in the illustration below, are able to grasp a whole layer of ingots lying side by side.

Electric ingot crane for transporting blooms



Delivered for the Rhein. Stahlwerke, Duisbg.-Meiderich



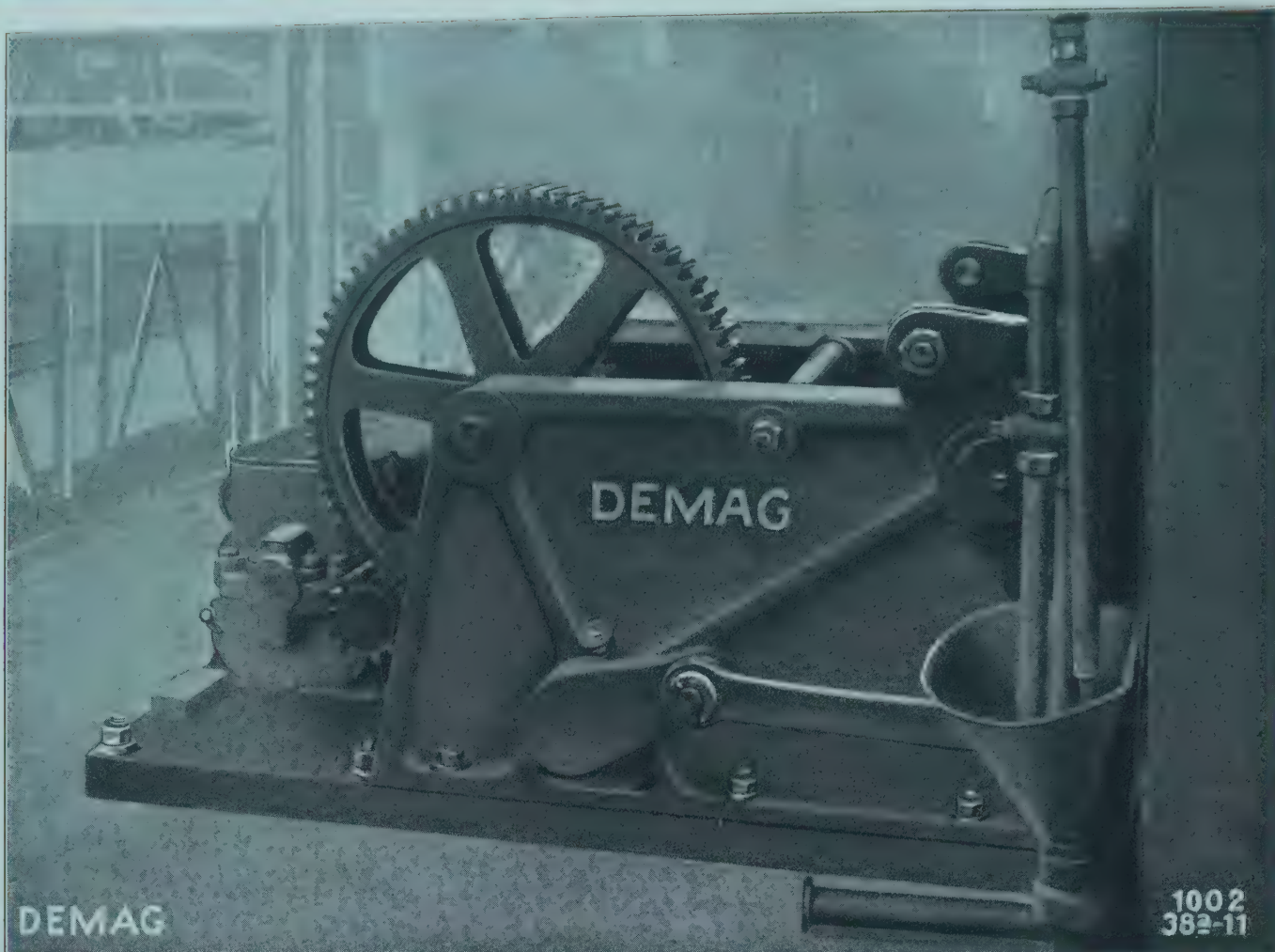


TRAVELLING ELECTRIC INGOT PUSHING DEVICE OF 35 000 KILOS. CARRYING CAPACITY / DELIVERED FOR THE GELSENKIRCHENER BERGWERKS-AKTIEN-GESELLSCHAFT, DEPARTMENT: AACHENER HÜTTENVEREIN, AACHEN-ROTHE ERDE

Stationary ingot pushing device with electric drive.  
We have delivered large numbers of such ingot pushing devices to firms both at home and abroad.





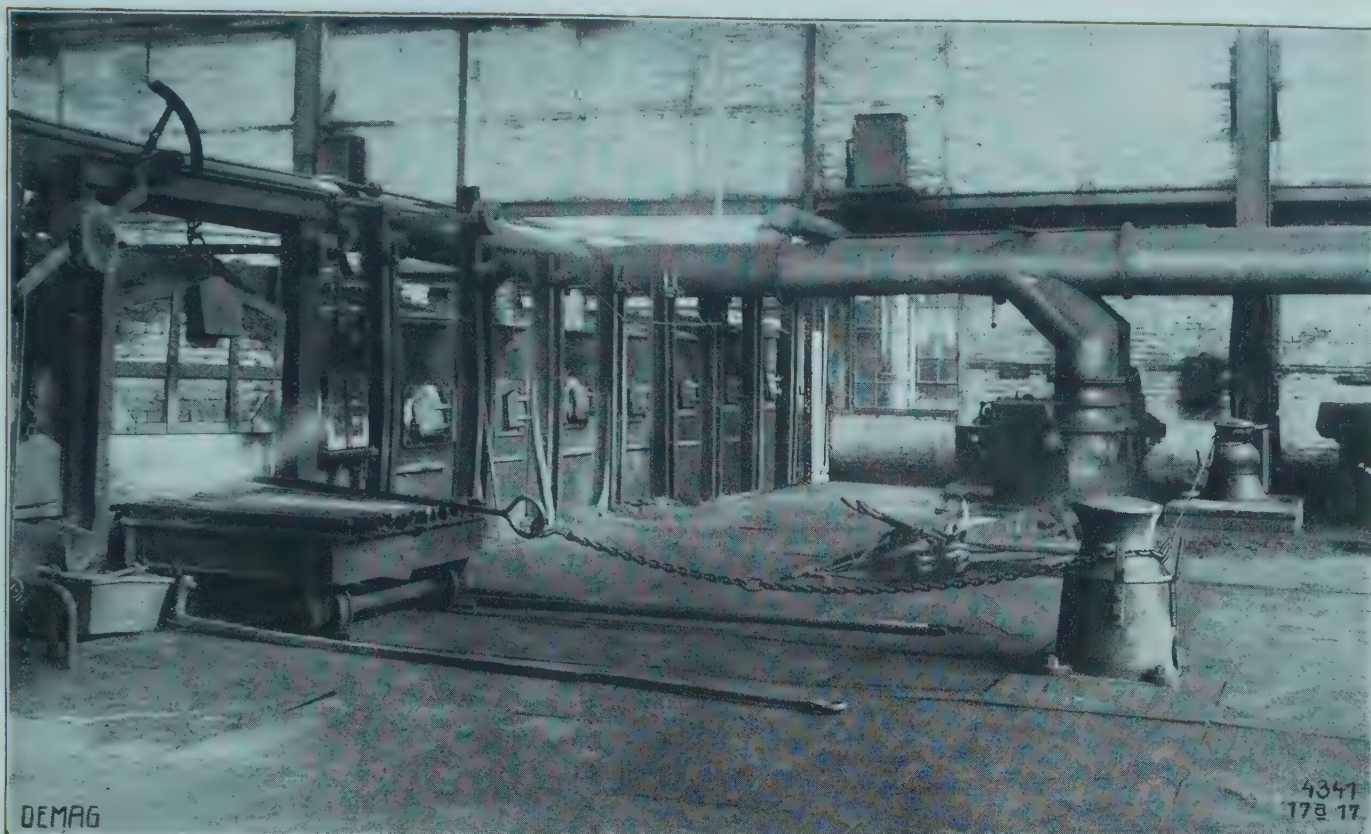


ELECTRIC BILLET FEED WITH 300 mm. STROKE AND 50 TONS PRESSURE / DELIVERED TO THE DEUTSCH-LUXEMBURGISCHE BERGWERKS- UND HÜTTEN-AKTIENGESELLSCHAFT, DIFFERDINGEN (LUXEMBURG)

ELECTRIC INGOT CHARGING MACHINE / DELIVERED FOR THE PEINER WALZWERK AKTIENGESELLSCHAFT, PEINE

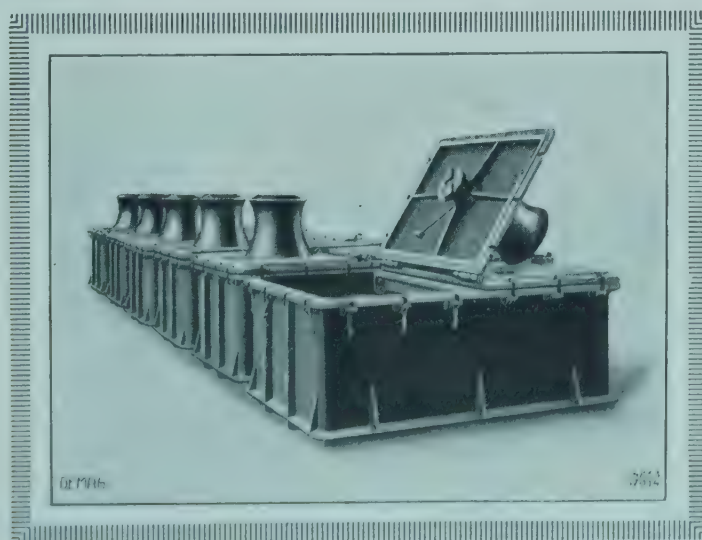






ELECTRIC INGOT WITHDRAWING CAPSTAN  
DELIVERED FOR THE GEISWEIDER EISENWERKE, GEISWEID

Our electric capstans are distinguished for the simplicity of their gearing, absolute proof against atmospheric influences and the moisture of the ground, high efficiency and very great safety in working. The construction, which is the result of many years' thorough trials, requires but little room. The manifold advantages offered by the electric capstan, which is used in harbours, in factory-yards and storeyards for shunting railway waggons, have made it part of installations for other purposes as well, such as for drawing the ingots out of the furnaces in rolling mills as shown in the above illustration.



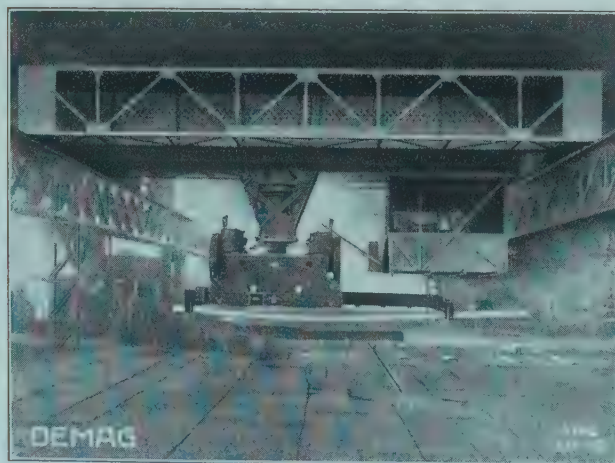




ELECTRIC INGOT CHARGING CRANE / DELIVERED FOR THE OBER-SCHLESISCHE EISENBAHNBEDARFS-A.-G., FRIEDENSHÜTTE, UPPER SILESIA

**F**or feeding the ingots in to the reheating furnaces and withdrawing them again charging cranes or charging machines which travel along the floor are used. The charging cranes are very differently equipped to suit the requirements of the individual cases. All charging cranes have suitable tongs for gripping the ingots.

Electric  
ingot charging  
crane with  
tiltable tongs



Usines  
Metallurgiques du  
Hainaut Soc. Anon.  
Couillet (Belgium)

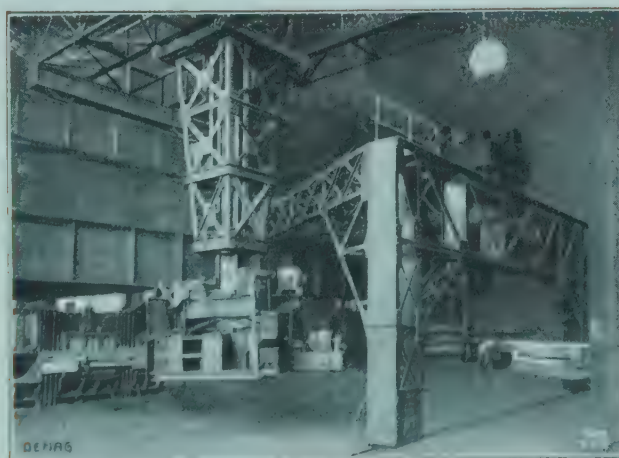




ELECTRIC INGOT CHARGING CRANE / DELIV. FOR THE METALLURG. WORKS OF KRAMATORSKAJA LTD., KRAMATORSKAJA, GOV. CHARKOW (RUSSIA)

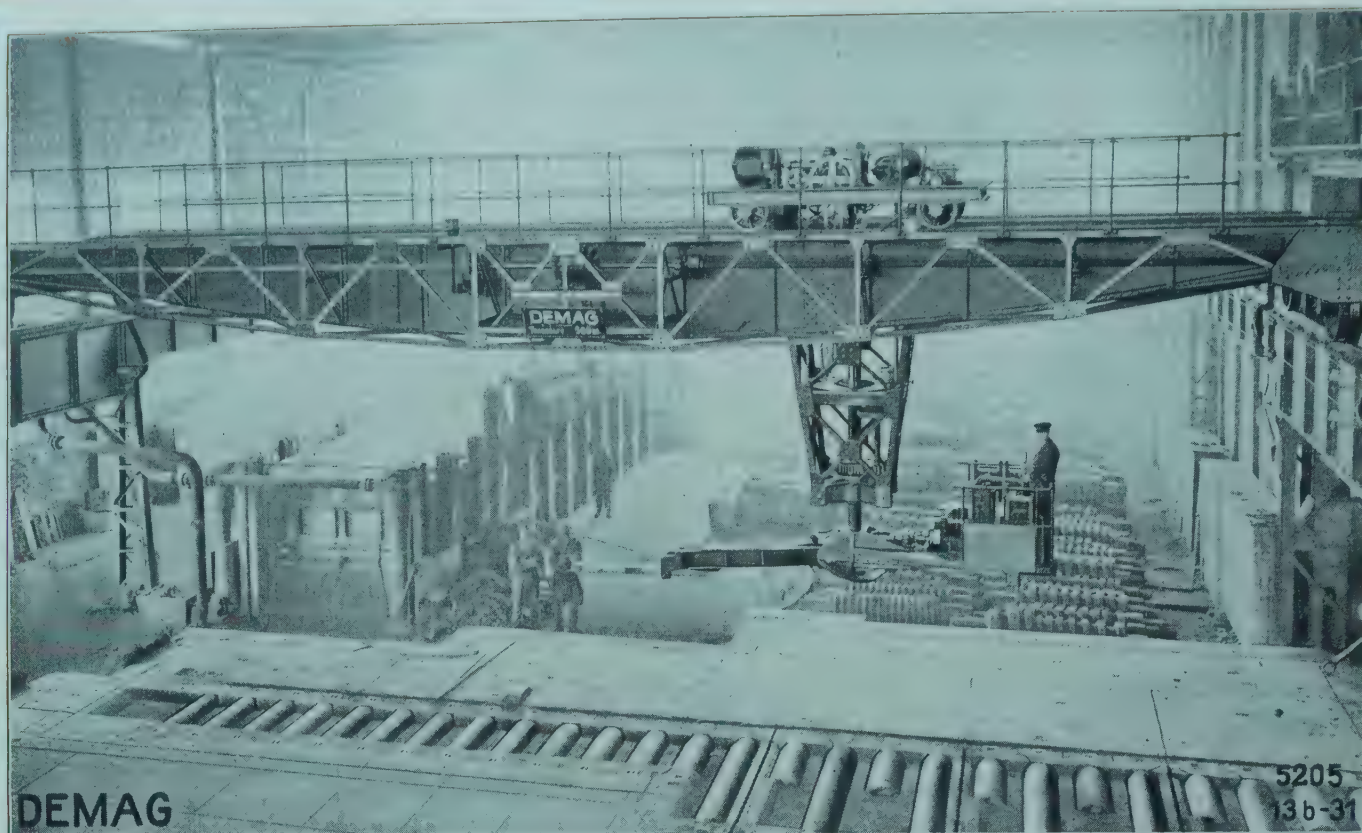
**A**nother form of tongs is shown in the above illustration. For this kind of tongs it is necessary that the ingots should lie with the back end free, or on a grating or some other similar device, both in the furnace and outside it, so that the projecting bottom plate can be pushed under the ingot. The ingot is held firm by pressing the pointed projection of the upper plate into it.

Two electric ingot charging cranes.



Delivered for  
Henschel & Sohn,  
Dept.: Henrichshütte,  
Hattingen, Ruhr.





**ELECTRIC INGOT CHARGING CRANE WITH FIVE MOTORS FOR INGOTS UP TO 500 Kilos., SPAN 17 m. DELIVERED FOR THE DEUTSCH-LUXEMBURGISCHE BERGWERKS-UND HÜTTEN-AKTIENGESELLSCHAFT, DIFFERDINGEN (LUXEMBURG)**

**T**he above illustration shows a crane which serves for taking up the rough rolled ingots arriving on the roller gear, conveying them to the reheating furnace, drawing them out again and laying them on the roller gear. Attached to the crab and suspended between the crane girders is a frame in which a steel pillar can move up and down in guides, being moved by two Gall's chains. The pillar, which is on ball bearings and therefore revolves very lightly about its axis, has a charging lever at its lower end. To one end of this lever is attached a pair of tongs made of cast steel, the driver's stand being erected on the other end. The tongs and the driver's stand can be raised or lowered 1.2 metres.



# HYDRAULIC INGOT



## PUSHING DEVICE

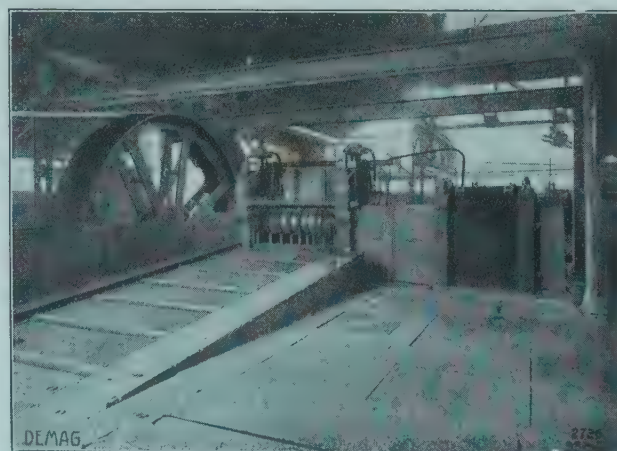
LARGE NUMBERS MADE





**THREE-HIGH COGGING MILL / DELIVERED FOR GEBRÜDER STUMM,  
GESELLSCHAFT MIT BESCHR. HAFTUNG, NEUNKIRCHEN (SAAR)**

The cogging mill consists of a three-high housings with rolls 600 mm. in diameter. Before the mill is a stationary roller gear, whilst behind it is an electric oscillating table which is shown in the upper illustration lowered, and in the lower one raised to its full height.







THREE-HIGH MEDIUM BAR ROLLING MILL FOR ROLLS FROM 550 mm. TO 600 mm. IN DIAM. / DELIV. FOR FERR. DI UDINE E PONT ST. MARTIN, UDINE

The illustration below shows a three-high cogging mill delivered for the Düsseldorf Eisen- und Draht-Industrie-Aktiengesellschaft, Düsseldorf. The mill consists of one housings with rolls 485 mm. in diameter. Behind the housings is the roller gear conveyor with a hot shearing machine built in.





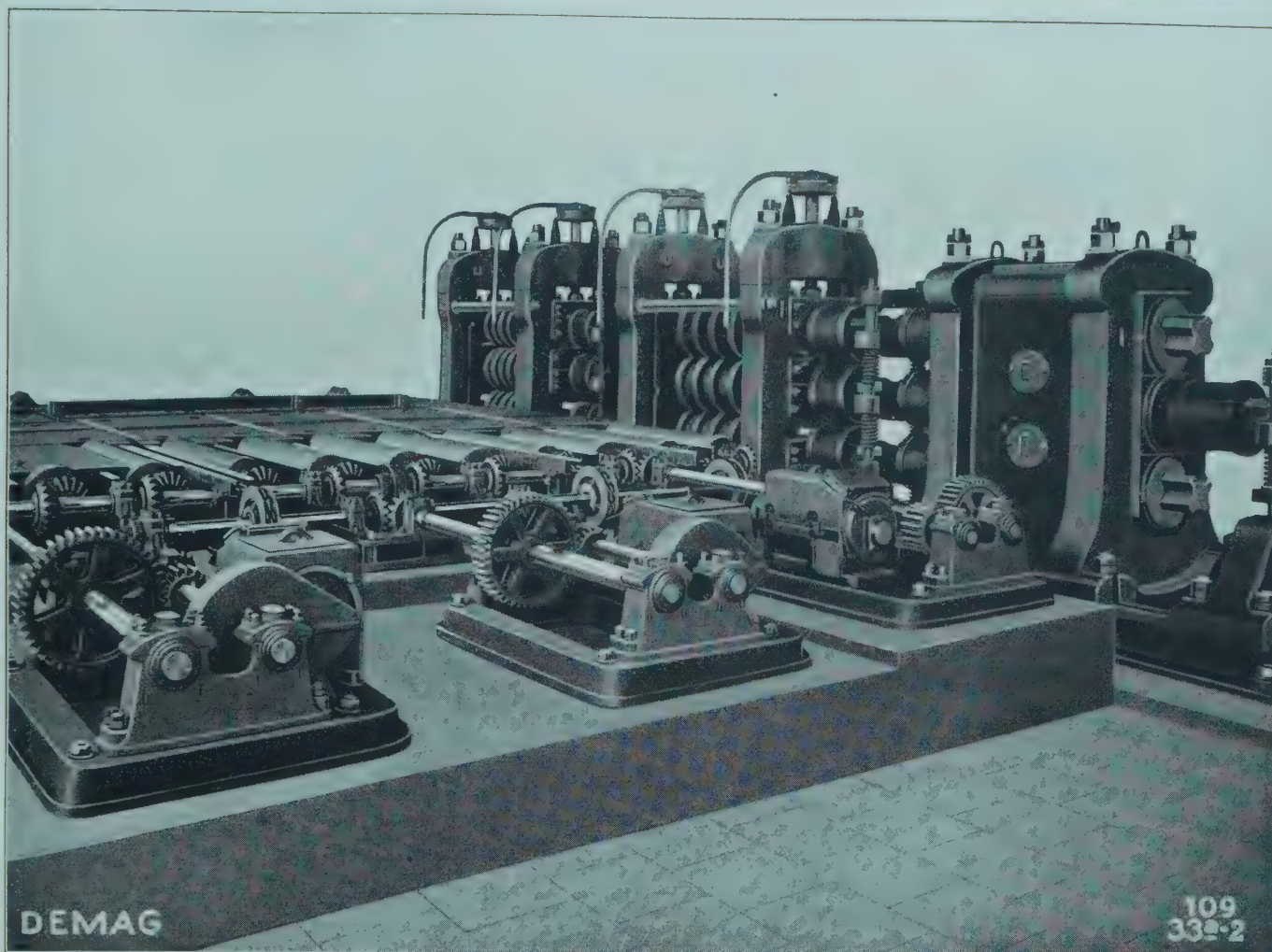


**THREE-HIGH MEDIUM BAR ROLLING MILL  
DELIVERED FOR THE GEISWEIDER EISENWERK, GEISWEID**

Continuous cogging mill consisting of six housings with a finishing mill in the back-ground. Delivered to the Lothringer Hüttenverein Aumetz-Friede, Kneuttingen.







THREE-HIGH ROLLING MILL FOR BAR IRON / DELIVERED FOR THE RHEINISCHEN STAHLWERKE, DUISBURG-MEIDERICH

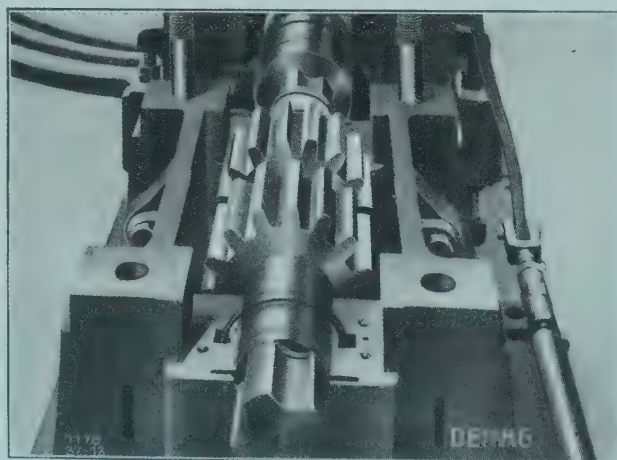
**T**he above illustration, from a photograph taken in the workshop, depicts the cogging mill housings of a complete bar iron rolling mill and shows, above all, the devices which, when erected ready for use, lie beneath the floor. Each of the two roller gears is driven by a motor and spur wheels, whilst the central motor runs the parallel skids.





## WIRE ROD ROLLING MILL PLANT FOR A WESTPHALIAN STEEL WORKS

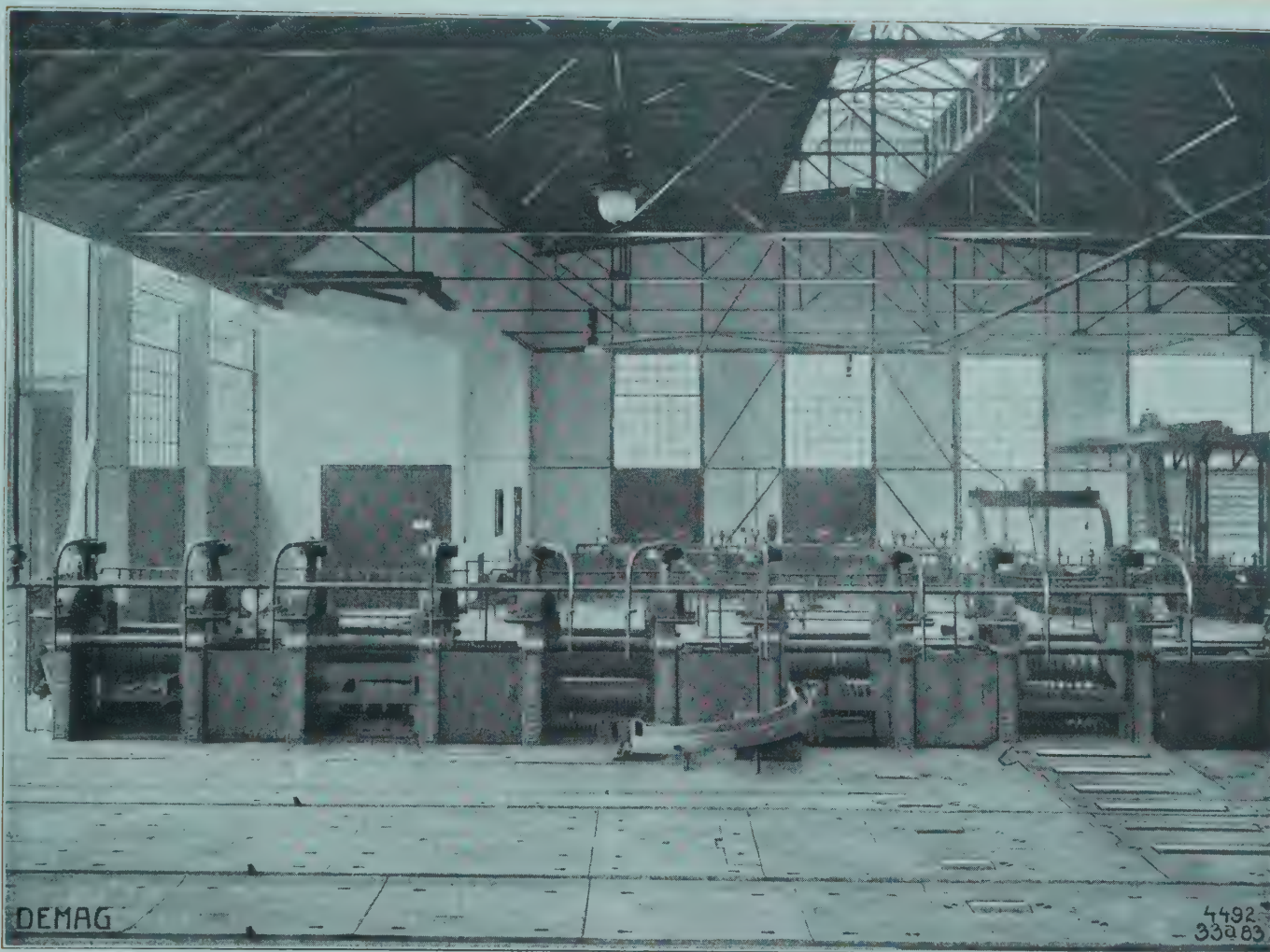
**T**he rolling mill plant consists of a single housings 420 mm. cogging mill and a finishing mill with rolls 330 mm. in diameter, the latter comprising six housings. Both mills are driven by electricity. The ingots to be rolled in the cogging mill have a cross-section of 130 mm. square and a length of 600 mm., and are rolled down in this mill to a cross-section of 50 mm. square and cut into lengths by a billet shearing machine erected between the cogging mill and the finishing mill.



SPINDLE  
HOUSINGS FOR

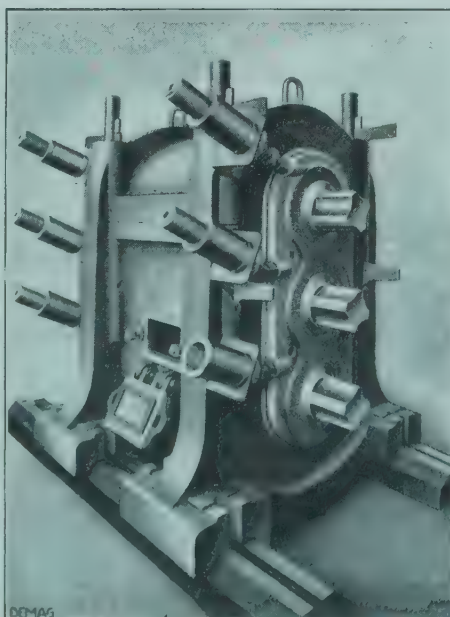
WIRE ROD  
ROLLING MILL





THREE-HIGH ROLLING MILL FOR THE KUPFERWERK DEUTSCHLAND AKTIEN-GESELLSCHAFT, OBERSCHÖNEWEIDE

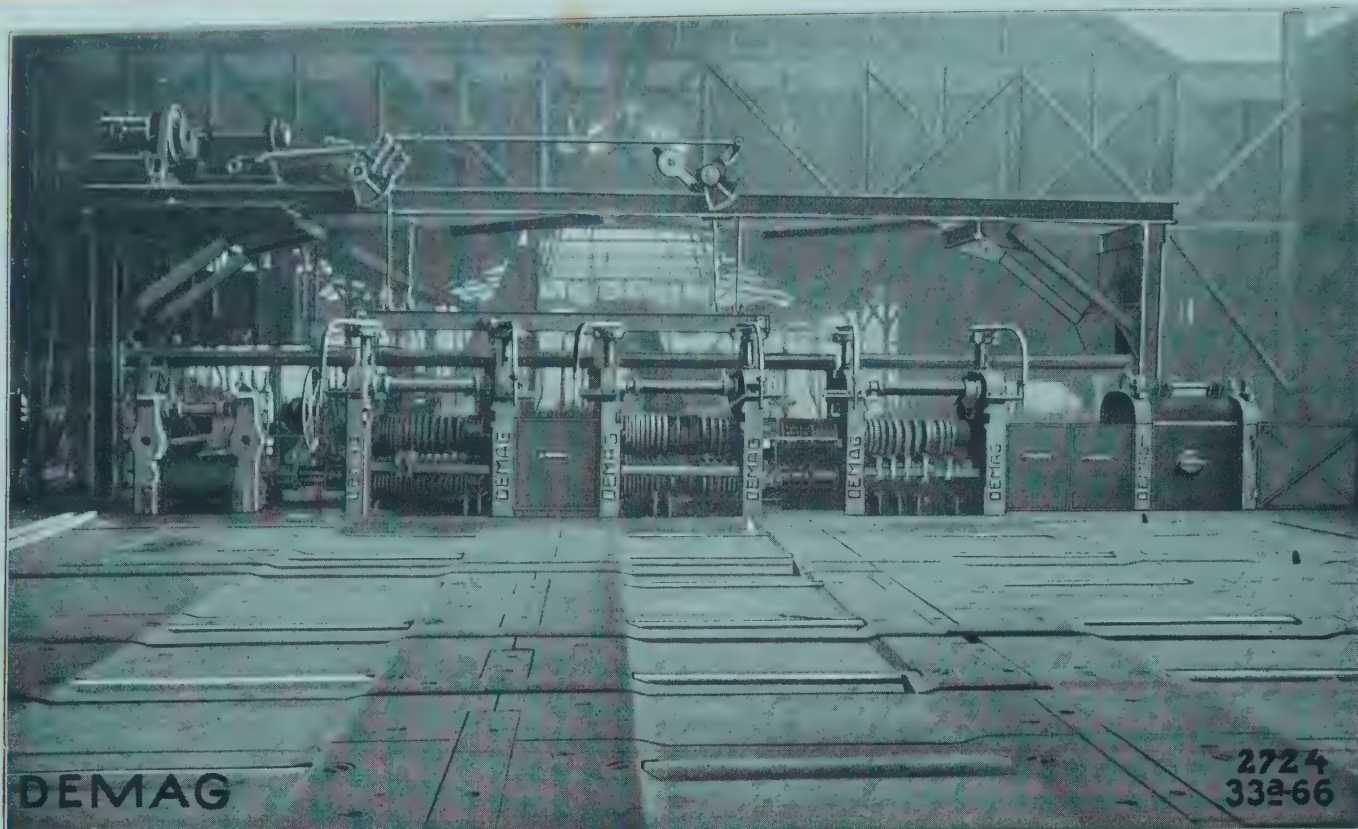
The mill consists of five housings with rolls 450 mm. in diameter, and serves for rolling copper rails and bars, as well as for cogging the material for the copper wire mill to be seen in the background of the illustration.



COMPLETELY  
CLOSED SPINDLE  
HOUSINGS FOR A

SMALL SECTION  
MILL / LUBRICATED  
WITH CALYPSOL

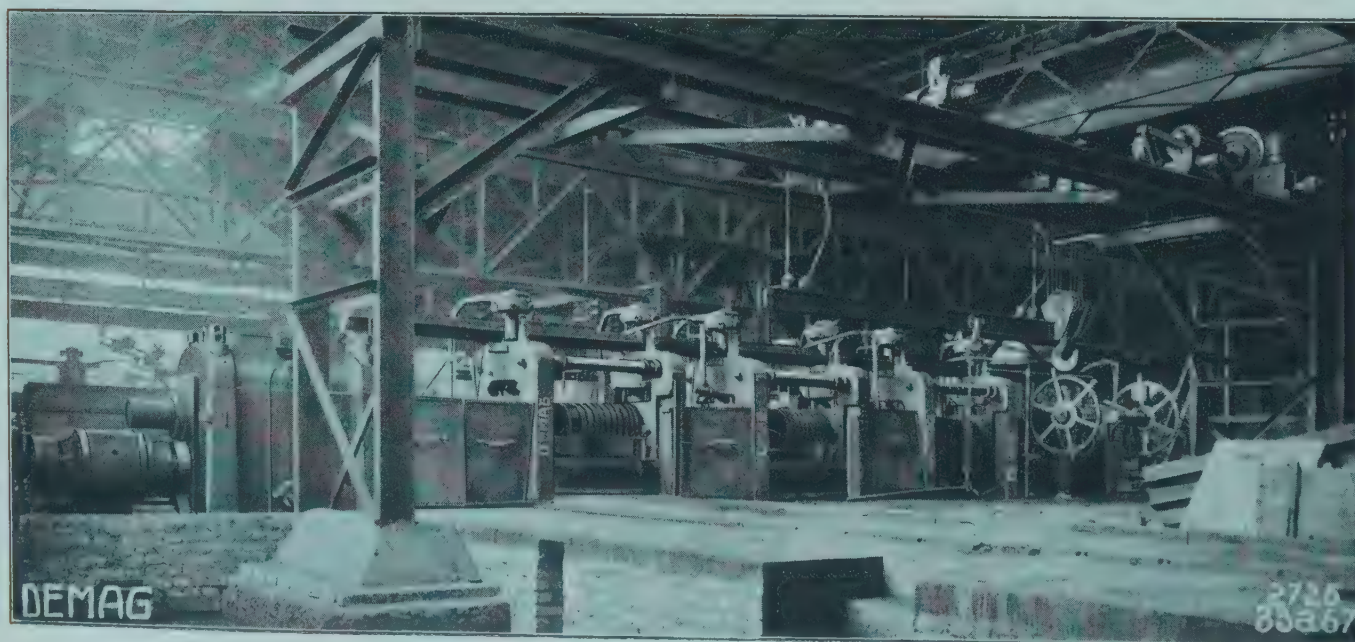




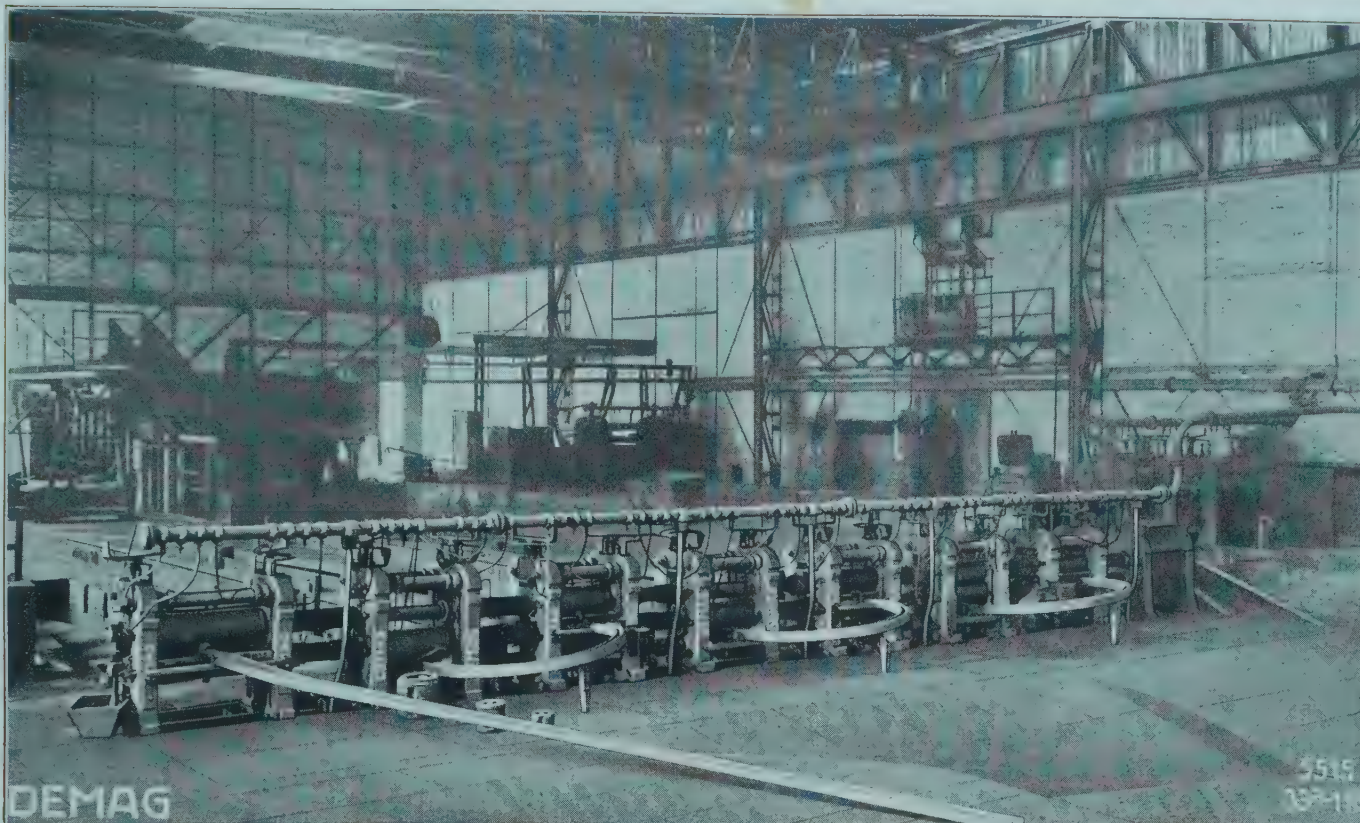
FOUR HOUSINGS 450 mm. MEDIUM BAR ROLLING MILL

Delivered for Gebrüder Stumm,  
G. m. b. H., Neunkirchen (Saar).

BACK VIEW OF THE SAME MILL



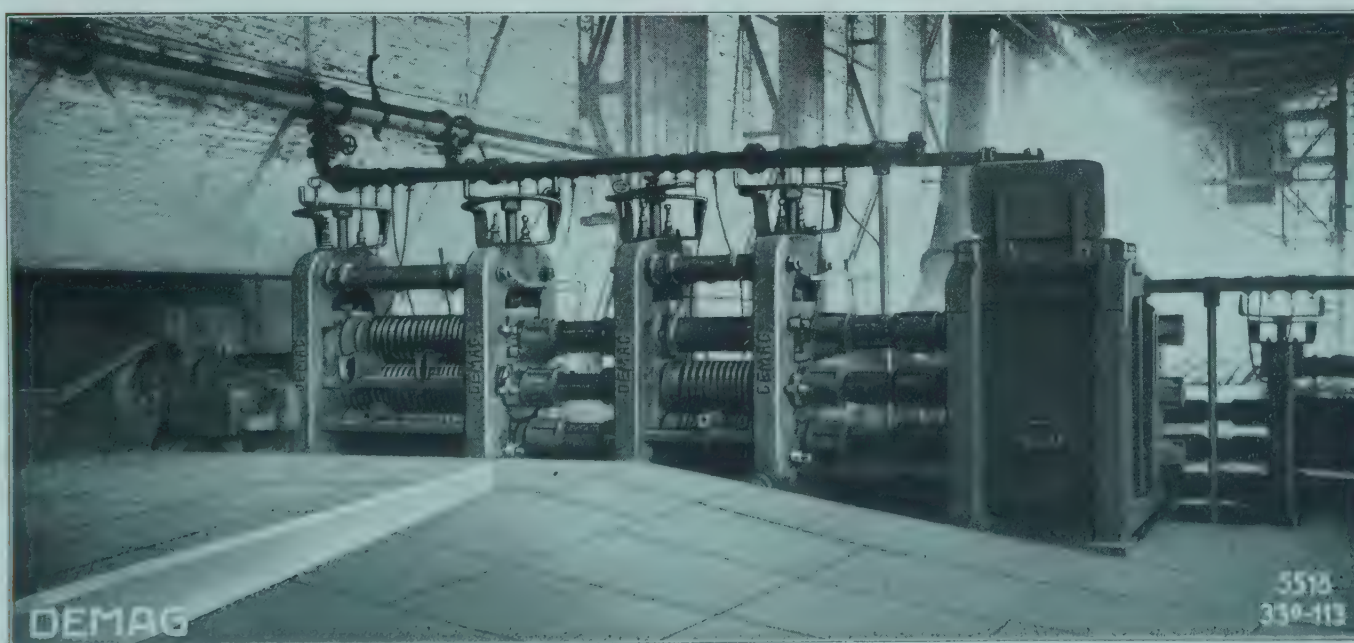




270 mm. THREE-HIGH SMALL SECT. MILL CONSIST. OF 7 HOUS.

Delivered to the Düsseldorfer Eisen- und  
Draht-Industrie, Aktien-Ges., Düsseldorf.

COGGING MILL FOR THE ABOVE SMALL SECT. MILL OF 7 HOUS.



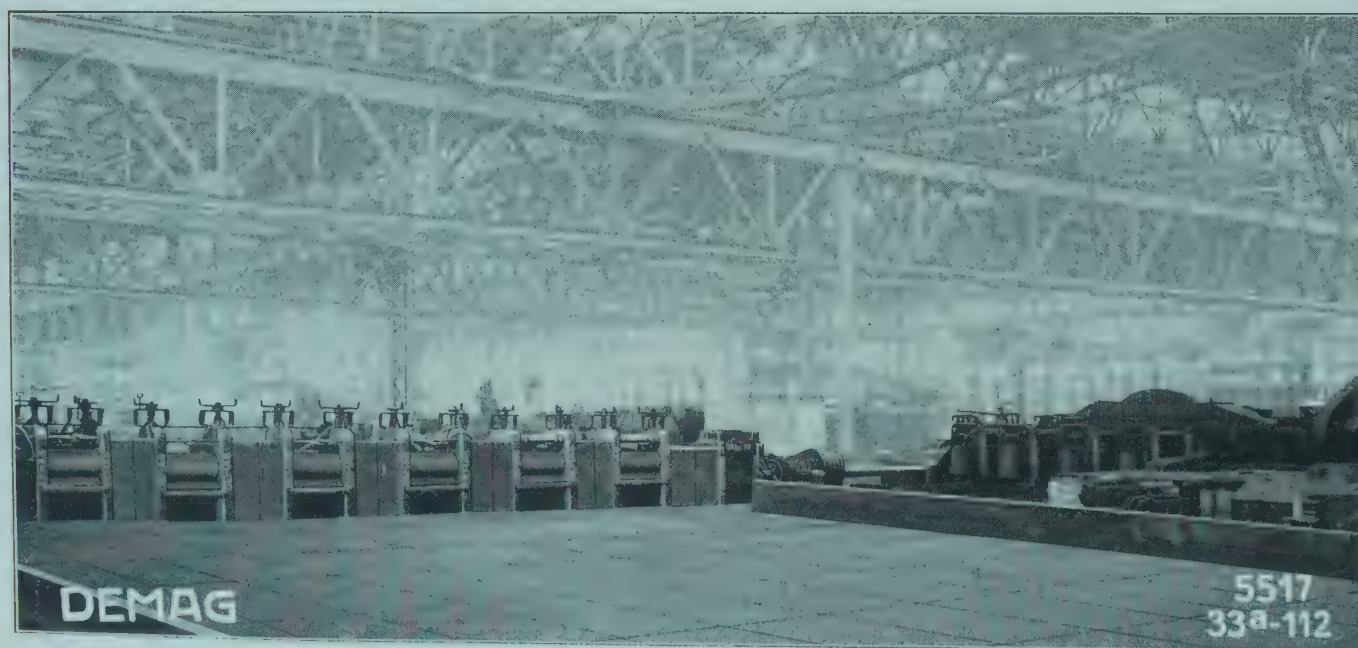




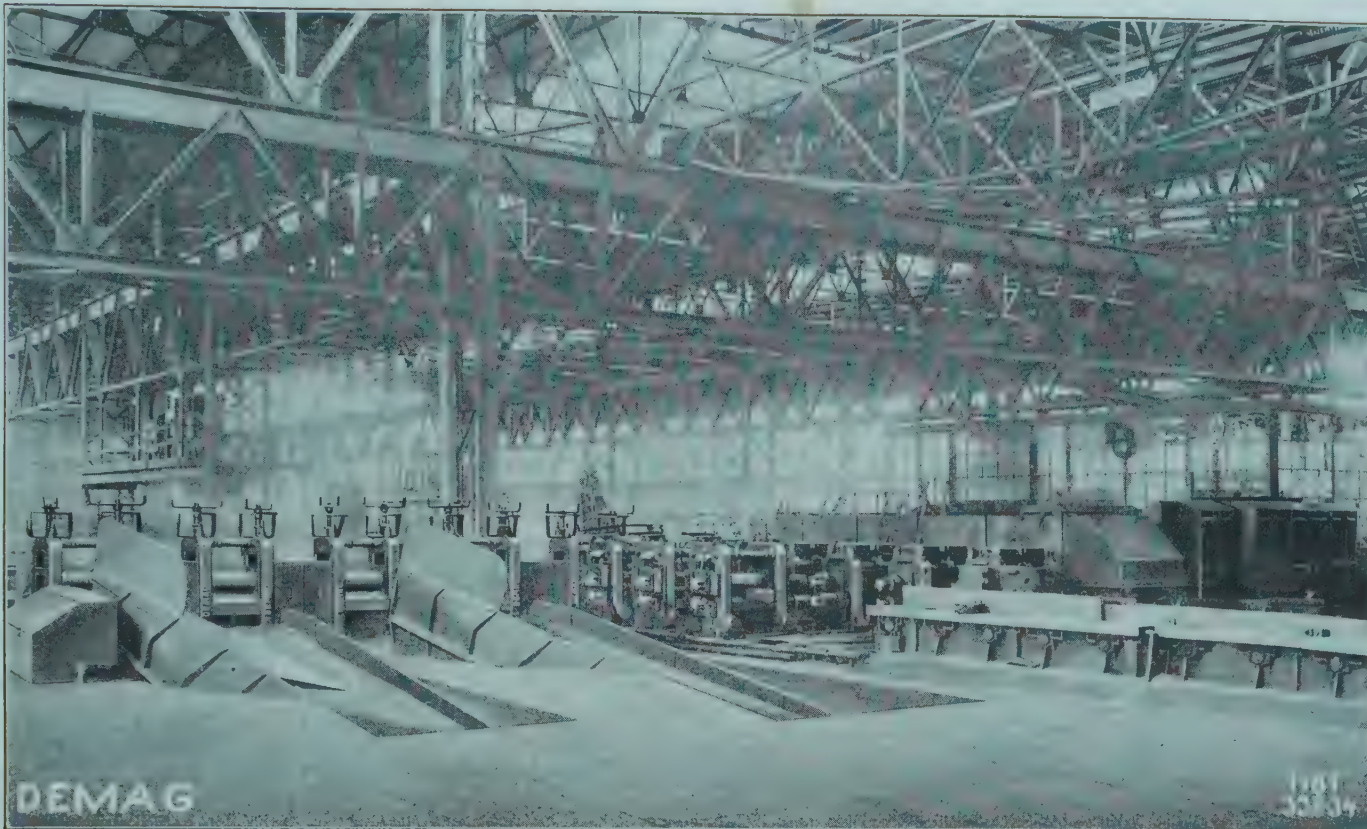
365 mm. THREE-HIGH MEDIUM SECT. MILL CONSIST. OF 6 HOUS.

Vereinigte Hüttenwerke Burbach-Eich-Düdelingen,  
A.-G., Werk Esch, Esch an der Alzette (Luxemburg).

310 mm. CONTIN. COGGING MILL WITH 300 mm. FINISHING MILL  
Both mills are run by electricity from a motor.







260 mm. SMALL SECT. MILL WITH CONTINUOUS COGGING MILL

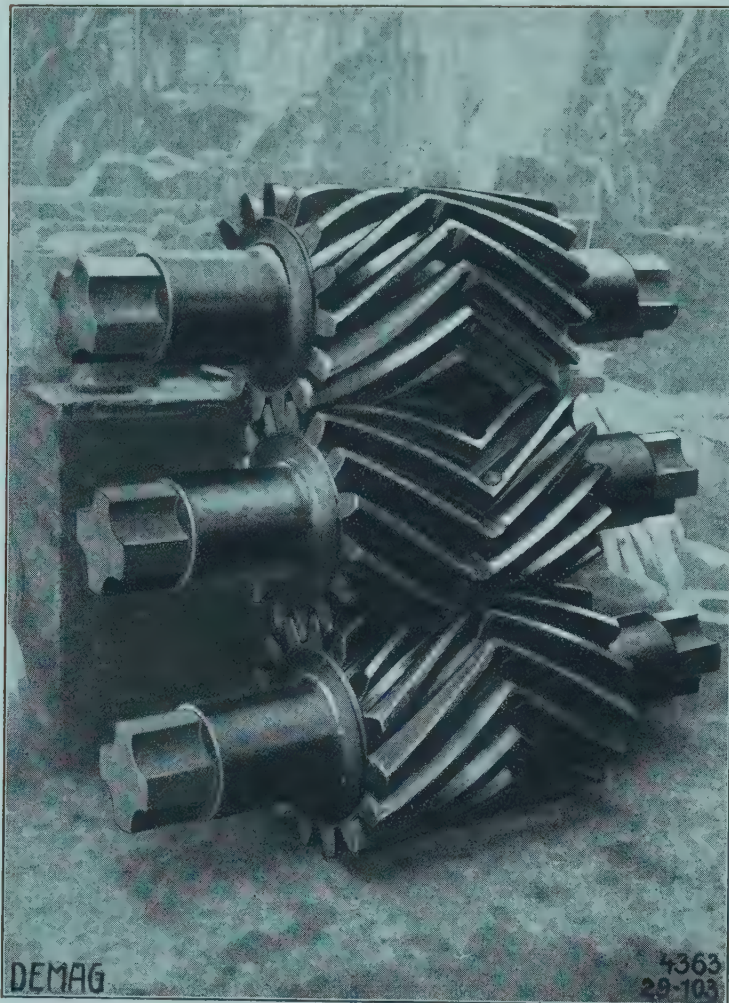
Vereinigte Hüttenwerke Burbach-Eich-Düdelingen,  
A.-G., Werk Esch, Esch an der Alzette (Luxemburg).

260 mm. SMALL SECT. MILL WITH CONTINUOUS COGGING MILL  
(Back view). Both mills are driven by electricity from a motor.





## PINIONS FOR THREE- HIGH SPINDLE HOUSINGS



HELICAL TEETH CUT FROM  
THE SOLID WHEEL



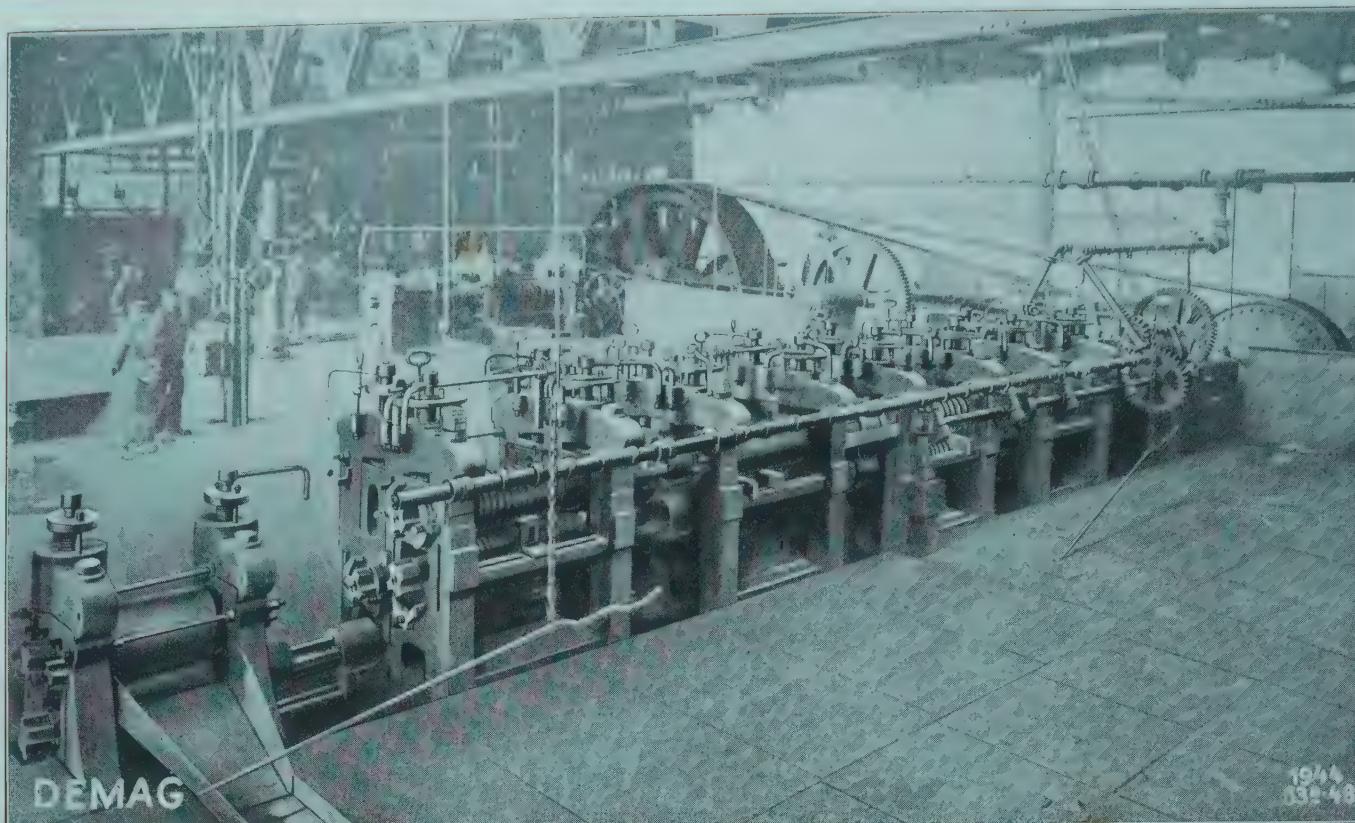
## THE DOUBLE TWO-HIGH MILL IN THE MEDIUM SECTION ROLLING MILL

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**T**he first construction of two pairs of rolls in one housings dates back to the middle of the eighties, experience having already shown that with the ordinary arrangement of the rolls in pairs it was much easier to reduce the rolled bar to the exact dimensions in the two-high mill than in the three-high mill. In order to combine the advantages of the two-high mill with those of the three-high one the idea of erecting two independent two-high rolls one above the other in the same housings was hit upon. On account of the upper first pass which, to make the work convenient, may not be too high, this arrangement is only advantageous up to a certain diameter of the rolls – about 400 mm. Formerly the double two-high mill was preferred in steel rolling mills for rolling exact section steel, and it is only quite recently that they have been applied for the manufacture of other sections, and especially hoop iron. In a modern double two-high mill, the rolls of which lie one behind another, each pair of rolls is adjusted separately by two adjusting screws. In the old-fashioned double two-high mills, in which the two pairs of rolls still lay one above another, the lower pair of rolls was adjusted separately by wedges under the housing accessories.

Moreover, as in the present arrangement the rolls lie one behind another in the housings, the height of the housings is considerably diminished. The following illustrations show a few of the many double two-high mills hitherto constructed by us.





350 mm. DOUBLE TWO-HIGH MILL WITH COGGING MILL / DELIVERED FOR THE HASPER EISEN- UND STAHLWERKE AKT.-GES., HASPE IN WESTPHALIA

240 mm. SMALL SECTION DOUBLE TWO-HIGH MILL WITH ROTATING SHEARING MACHINE BEHIND THE LAST HOUSINGS / DELIVERED FOR THE LOTHRINGER HÜTTENVEREIN AUMETZ-FRIEDE, KNEUTTINGEN

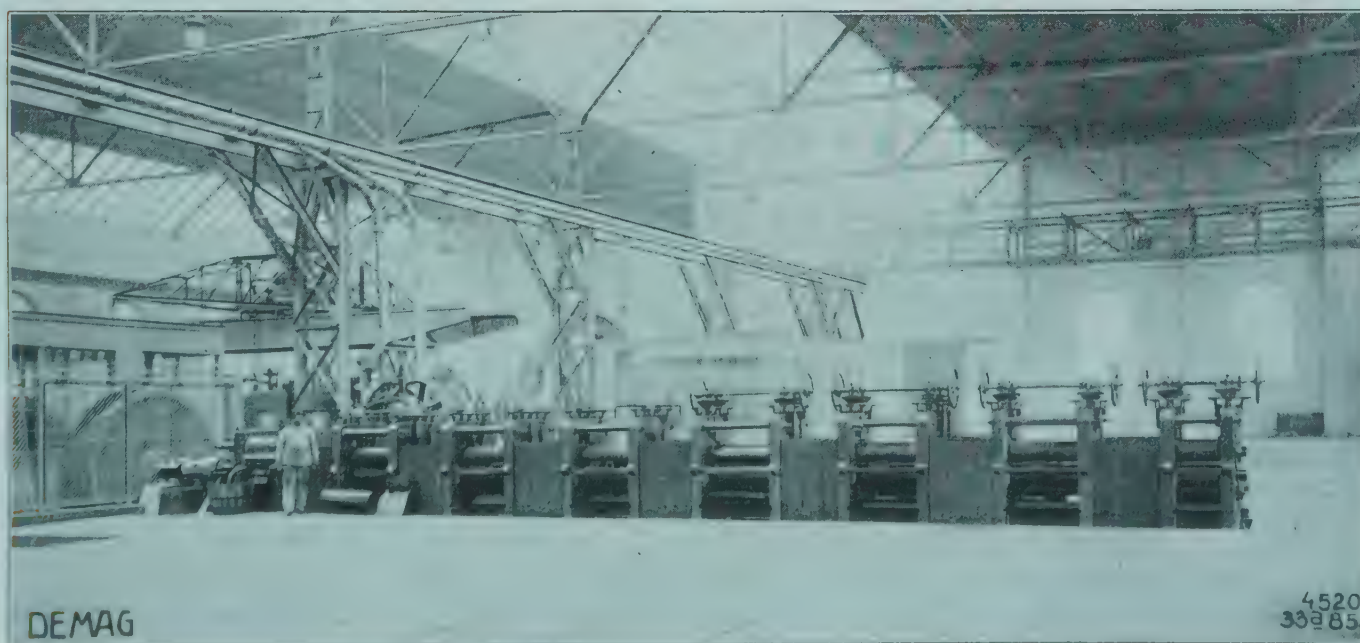




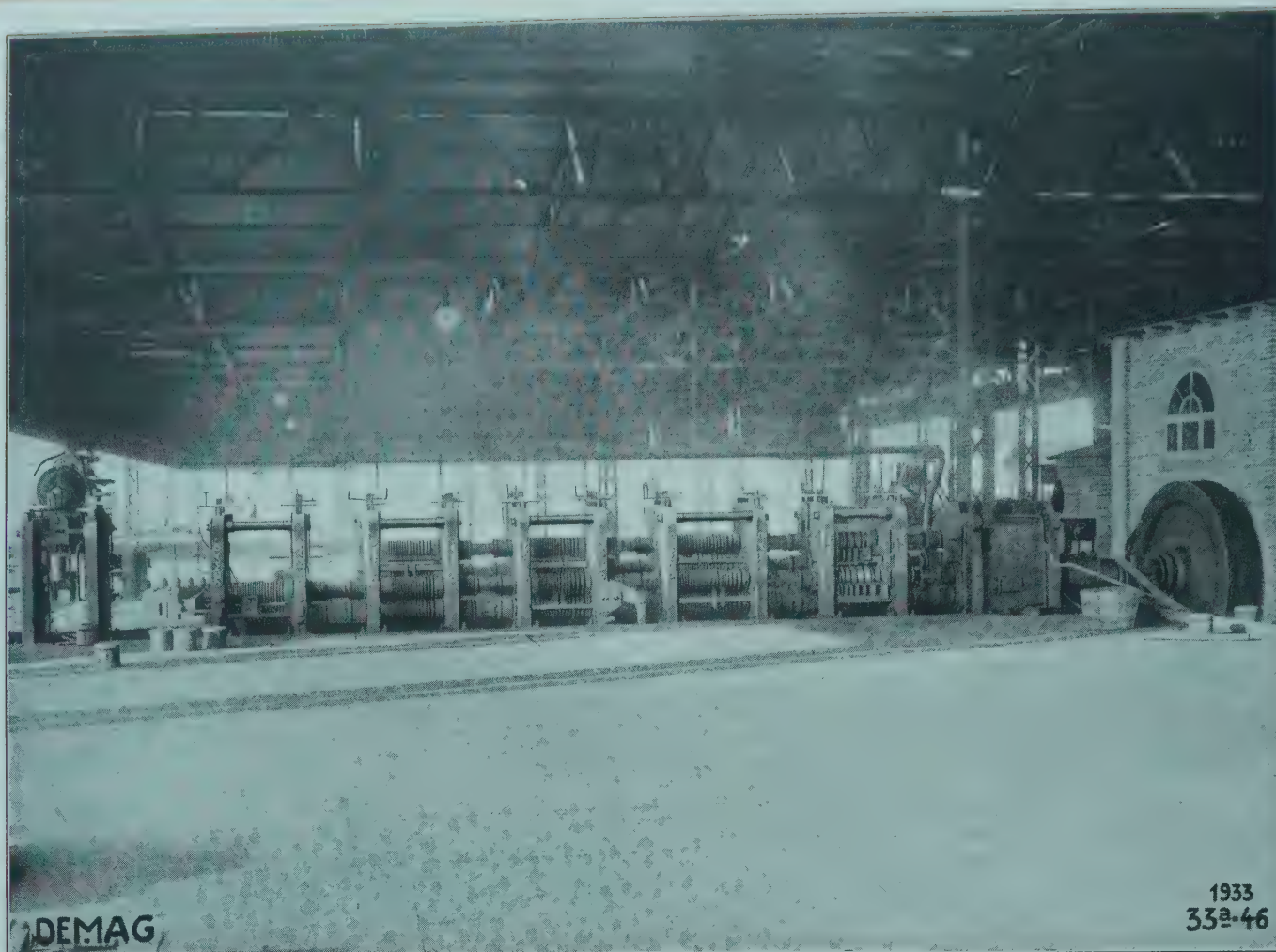


350 mm. DOUBLE TWO-HIGH MILL OF FIVE HOUSINGS FOR TOOL STEEL  
DELIVERED FOR THE STAHLWERK BECKER A.-G., WILlich nr. KREFELD

DOUBLE TWO-HIGH MILL OF SEVEN HOUSINGS FOR TOOL STEEL,  
ADJUSTMENT OF THE ROLLS BY A SPECIAL CONSTRUCTION FOR SPECIAL  
STEEL / DELIV. FOR THE STAHLWERK BECKER A.-G., WILlich nr. KREFELD

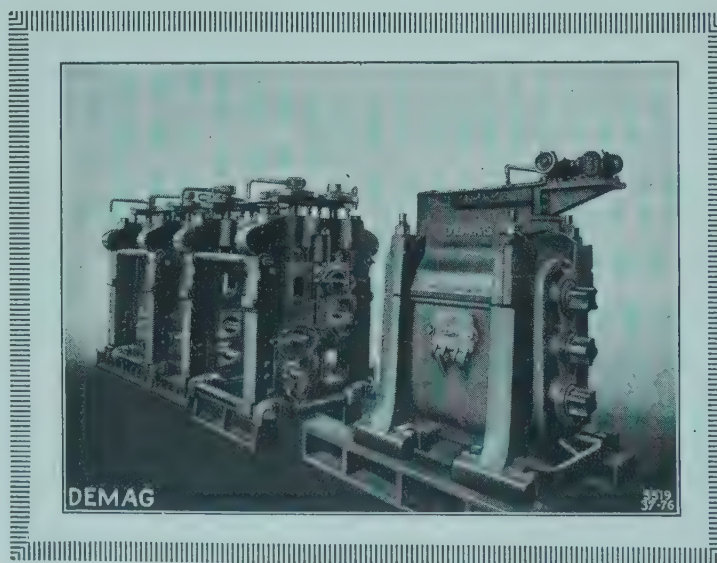






300 mm. MEDIUM SECTION DOUBLE TWO-HIGH MILL,  
FRONT VIEW / DELIVERED FOR THE SOCIETÀ ANONIMA  
ALTI FORNI E FONDERIA DI PIOMBINO, PIOMBINO (ITALY)

TWO DOUBLE TWO-HIGH HOUSINGS AND A THREE-HIGH  
SPINDLE HOUSINGS ERECTED IN THE WORKSHOP

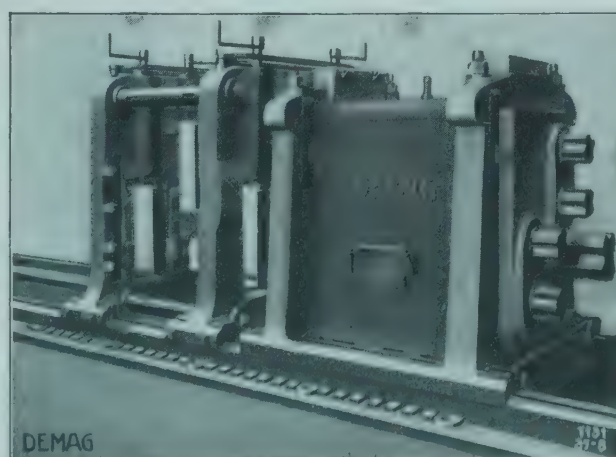






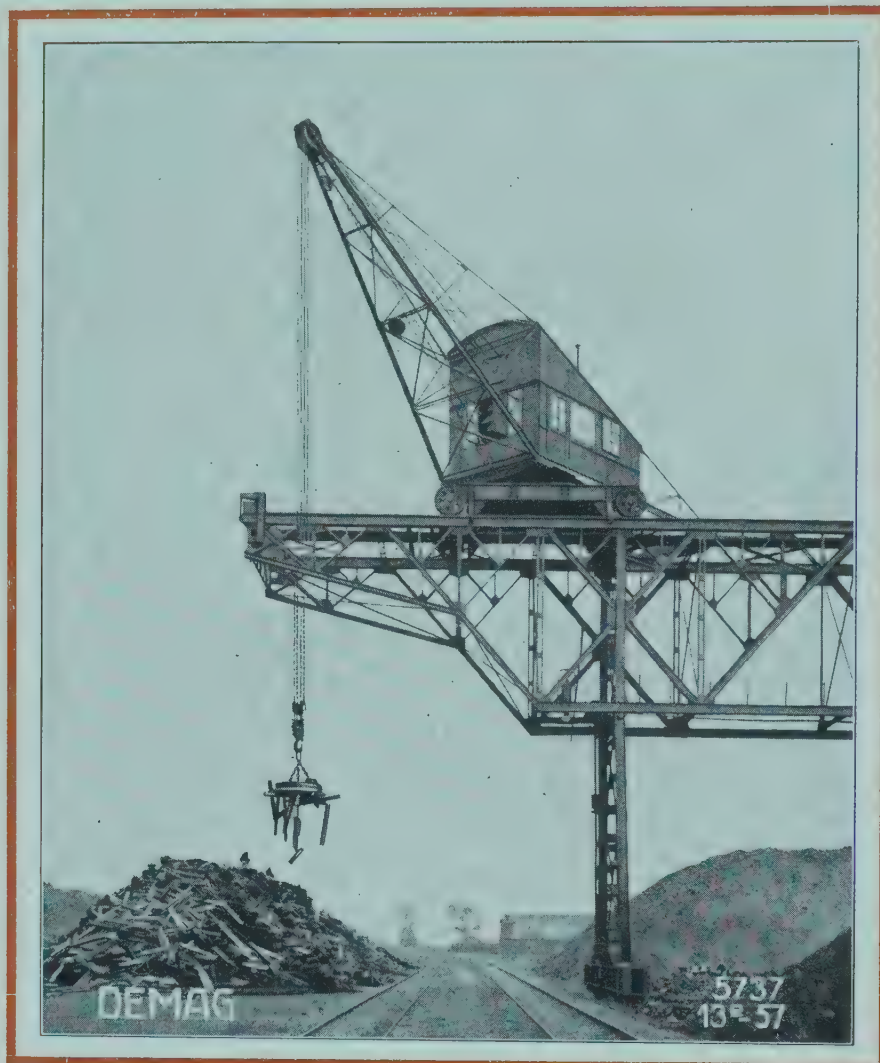
300 mm. MEDIUM SECTION DOUBLE TWO-HIGH MILL,  
BACK VIEW / DELIVERED FOR THE SOCIETÀ ANONIMA  
ALTI FORNI E FONDERIA DI PIOMBINO, PIOMBINO (ITALY)

DOUBLE TWO-HIGH SPINDLE HOUSINGS FOR THE  
ABOVE MILL ERECTED IN THE WORKSHOP





# LOADING ROLLING MILL SCRAP



## WITH A DEMAG LIFTING MAGNET



# THE CONTINUOUS ROLLING MILL

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**C**ontinuous rolling mills in which, contrary to other section rolling mills, the individual housings are arranged behind each other, are employed mainly for the manufacture of half finished goods, chiefly billets. Besides billets sheet billets for making sheets may also be rolled continuously to advantage. The reason for adopting the continuous system of rolling in the manufacture of small bars, billets and sheet billets was not only a considerable increase in the production but also the fact that the material leaves the continuous rolling mill much warmer, which is better for the rolling and also saves a good deal of power. As finishing rolls continuous rolling mills are seldom used because it has not yet been possible to obtain with them absolutely exact finished products. Continuous rail rolling mills possess the disadvantage already mentioned, that the finished product is lacking in exactness, so that such machines produce many spoiled pieces. Another reason why absolutely continuous finishing mills are not well suited for

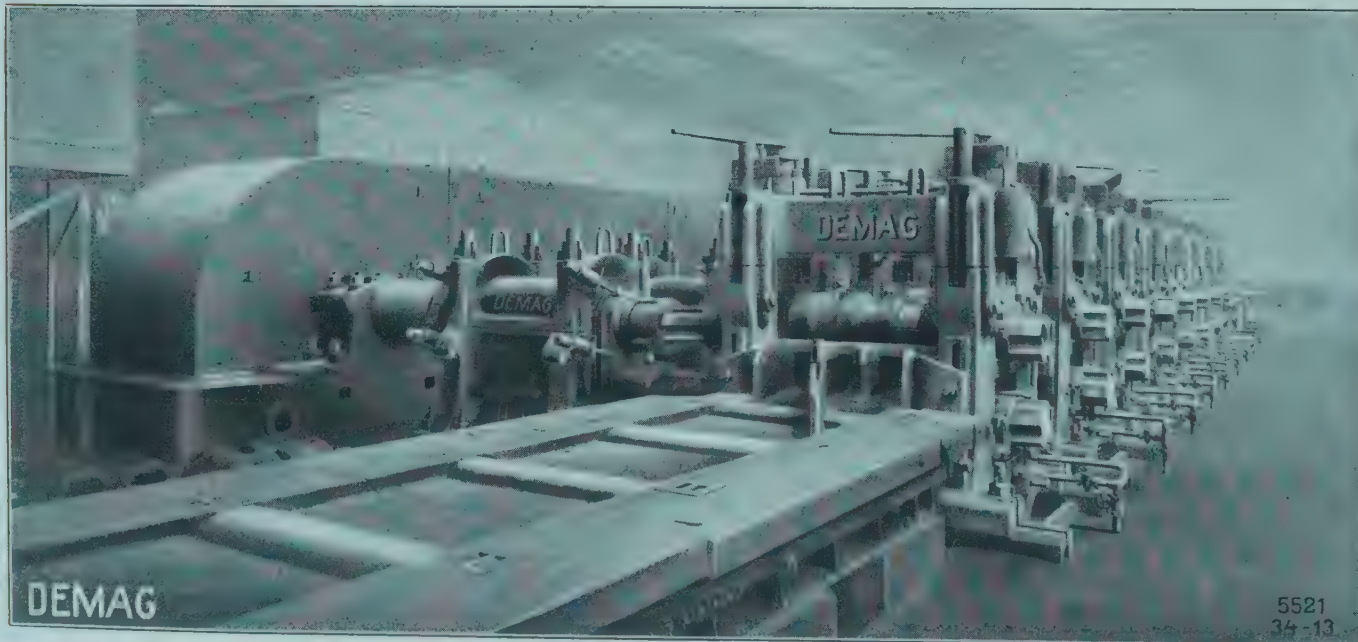
European conditions is that our finishing mills have so many different kinds of finished goods to roll that this would not be possible with absolutely continuous mills. The following illustrations show a few of the many continuous rolling mills erected by us for firms both at home and abroad.



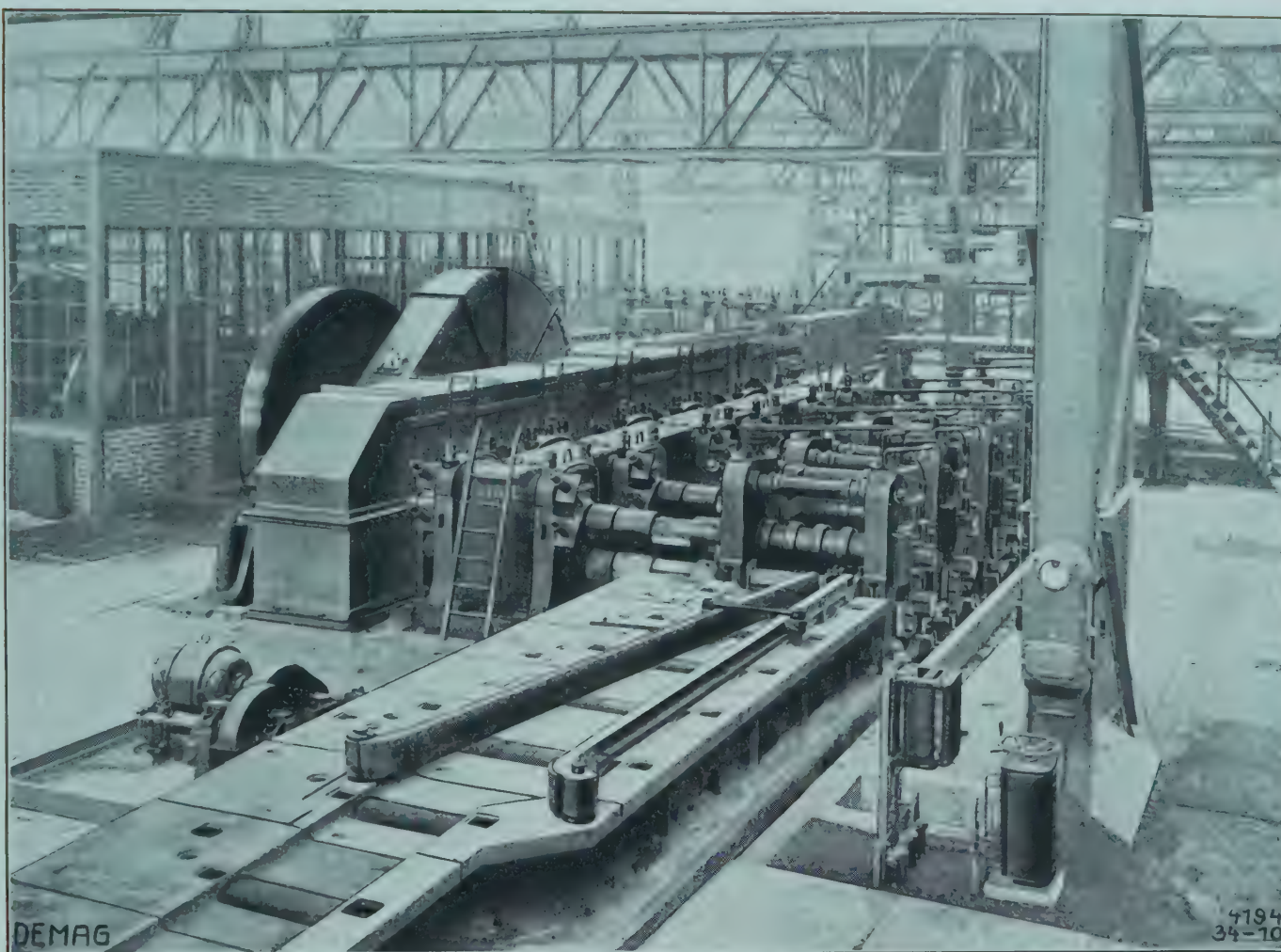


Back view of a 500 mm continuous billet and sheet bar rolling mill. Deliv. to the Gelsenkirchener Bergwerks-A.-G., Adolf-Emil-Hütte, Esch a. d. Alzette (Luxembg.)

Front view of the same continuous billet and sheet bar rolling mill. Gelsenkirchener Bergwerks-A.-G., Adolf-Emil-Hütte, Esch an der Alzette (Luxemburg).





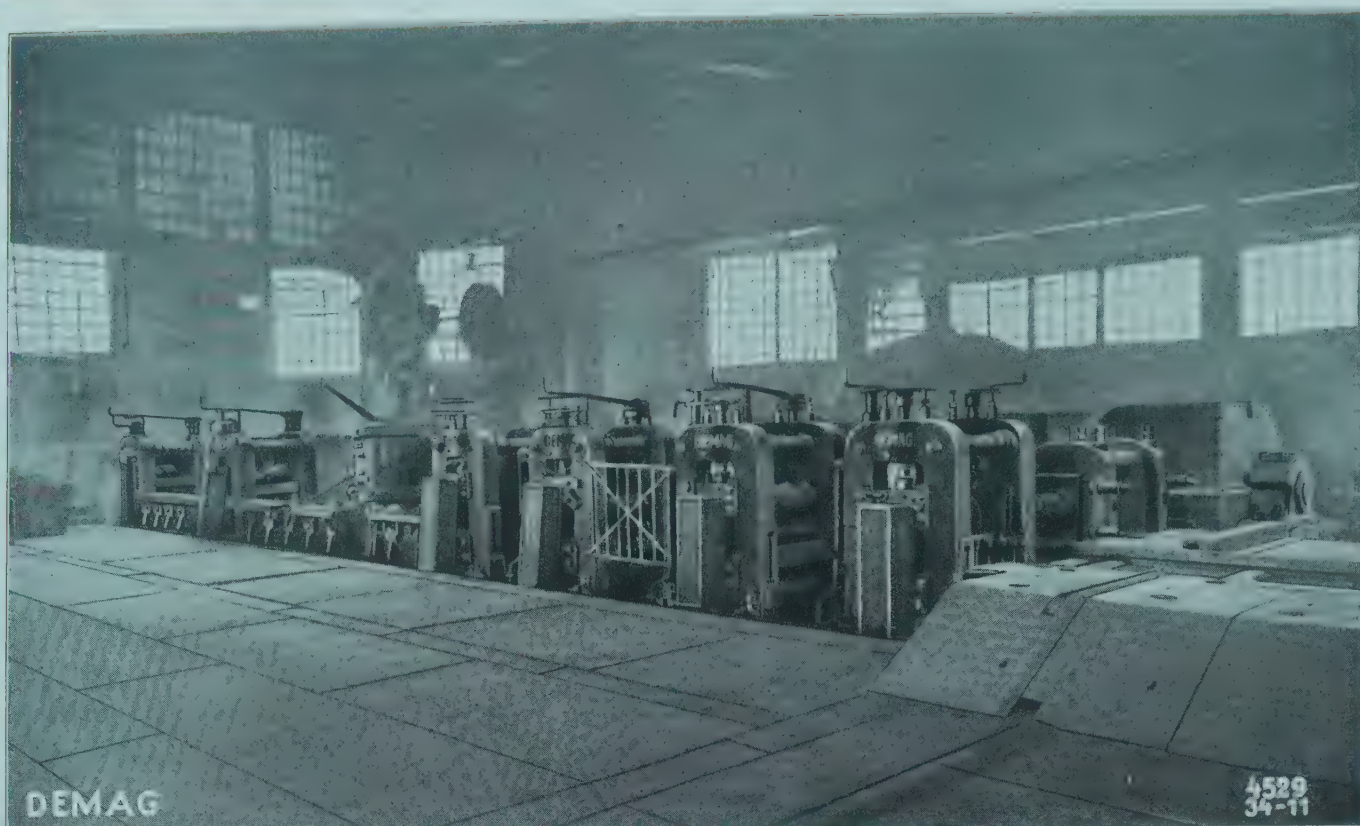


Continuous cogging mill for a small section mill of the Vereinigte Hüttenwerke Burbach-Eich-Düdelingen, Aktien-Gesellschaft, Esch an der Alzette (Luxemburg).

Continuous cogging mill for a small section mill of the Deutsch-Luxemburgischen Bergwerks- und Hütten-Aktien-Gesellschaft Differdingen (Luxemburg).

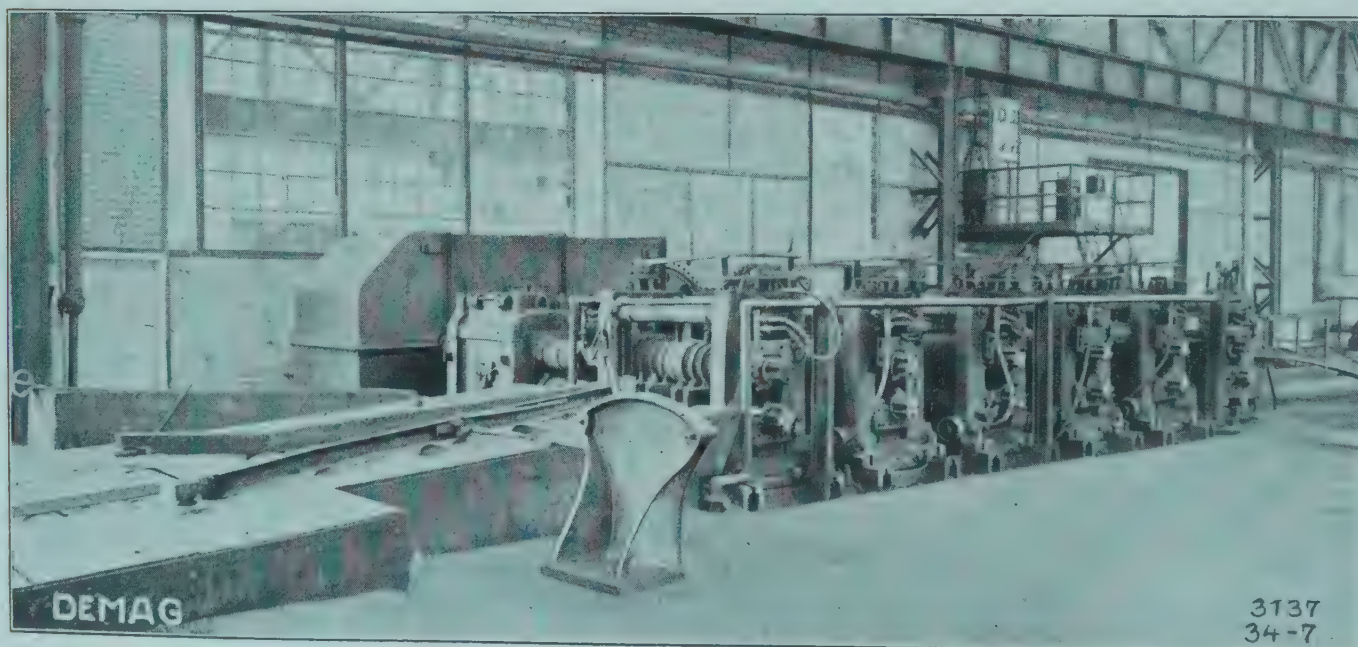




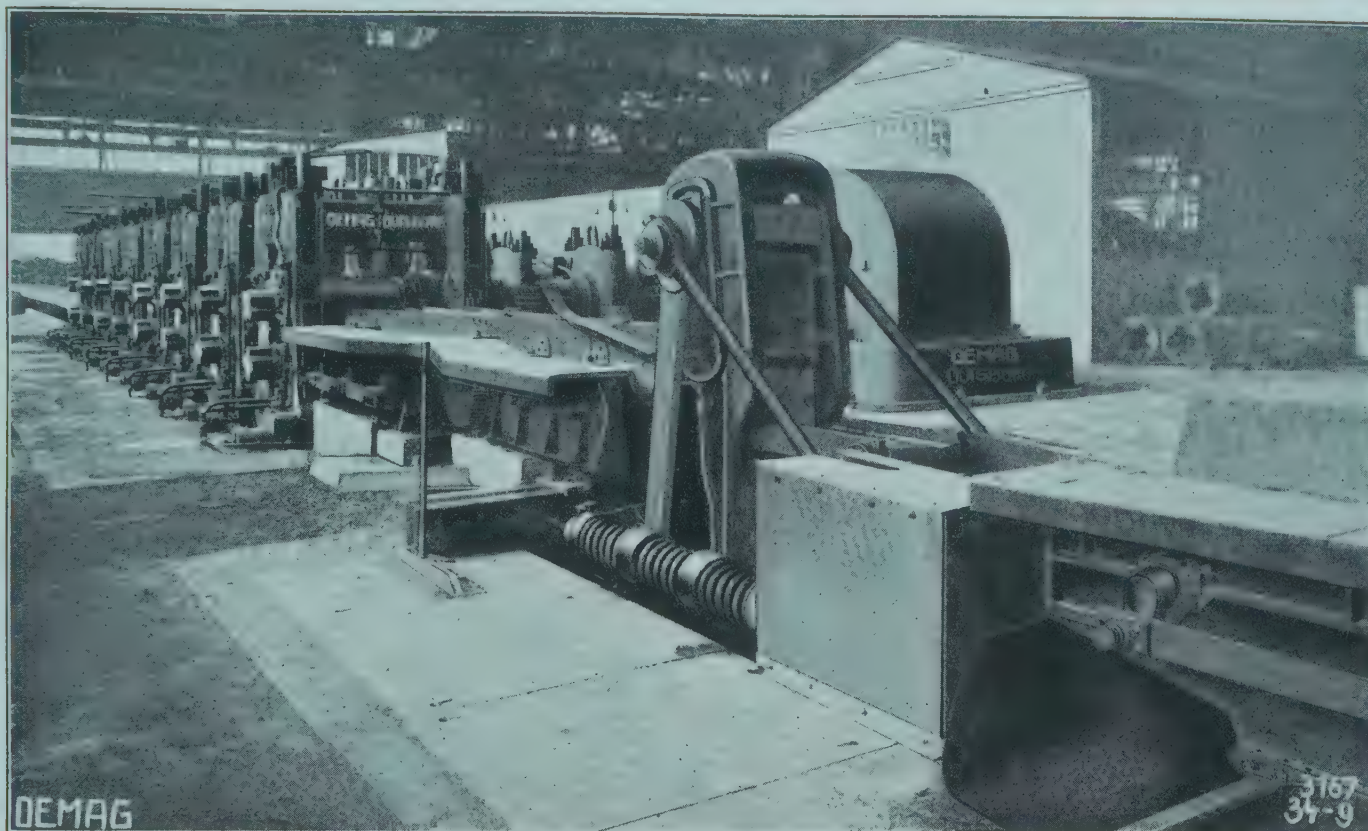


CONTINUOUS ROLLING MILL WITH SIX HOUSINGS FOR PIG BLOOMS  
DELIVERED FOR BISMARCKHÜTTE, AKTIENGESELLSCHAFT FÜR  
EISEN- UND HÜTTENBETRIEB, DEPARTMENT FALVAHÜTTE

CONTINUOUS COGGING MILL / DELIVERED  
FOR THE LOTHRINGER HÜTTENVEREIN AUMETZ-  
FRIEDE, KNEUTTINGEN (LOTHRINGEN)

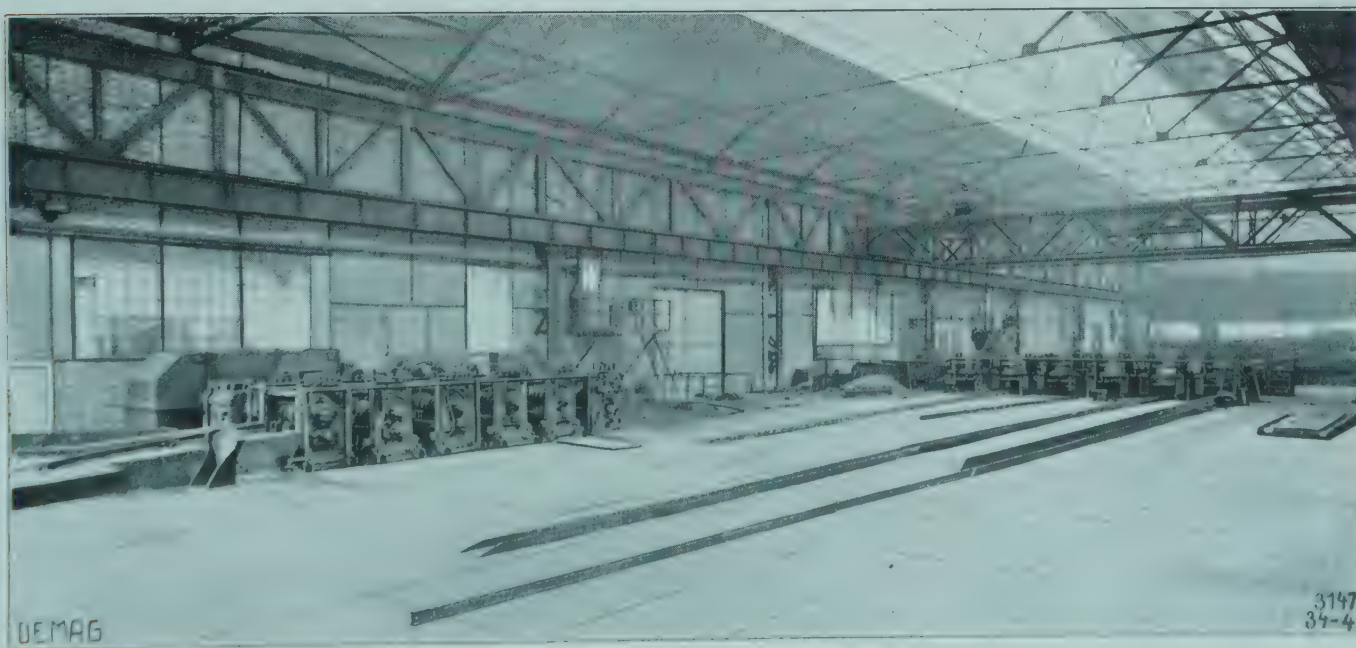






500 mm. CONTINUOUS BILLET MILL WITH SWING SHEARING MACHINE / THE LATTER ENABLES THE BILLETS TO BE CUT TO CERTAIN LENGTHS DURING THE ROLLING PROCESS

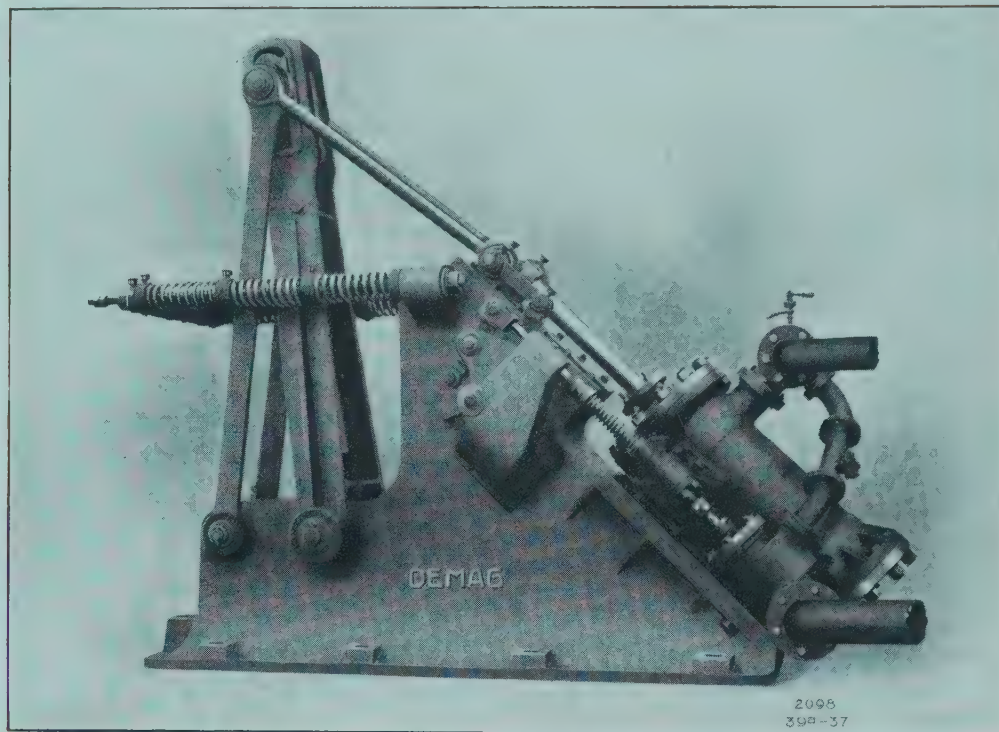
CONTINUOUS COGGING MILL WITH SMALL SECTION DOUBLE TWO-HIGH MILL BEHIND / DELIVERED FOR THE LOTHRINGER HÜTTENVEREIN AUMETZ-FRIEDE, KNEUTTINGEN (LOTHRINGEN)





# SWING SHEARING MACHINE FOR STEAM DRIVE

DELIVERED FOR THY-LE-CHATEAU AND ADOLF-  
EMIL-HÜTTE IN ESCH (LUXEMBURG) AND OTHERS



**I**n the swing shearing machine the blades move during the cutting process at the same speed as the material to be cut, and also in the same direction, so that the material can be cut during the rolling process. The machine is driven by saturated or superheated steam or compressed air. With the aid of an automatic measuring stop the lengths to be cut off can be accurately adjusted.

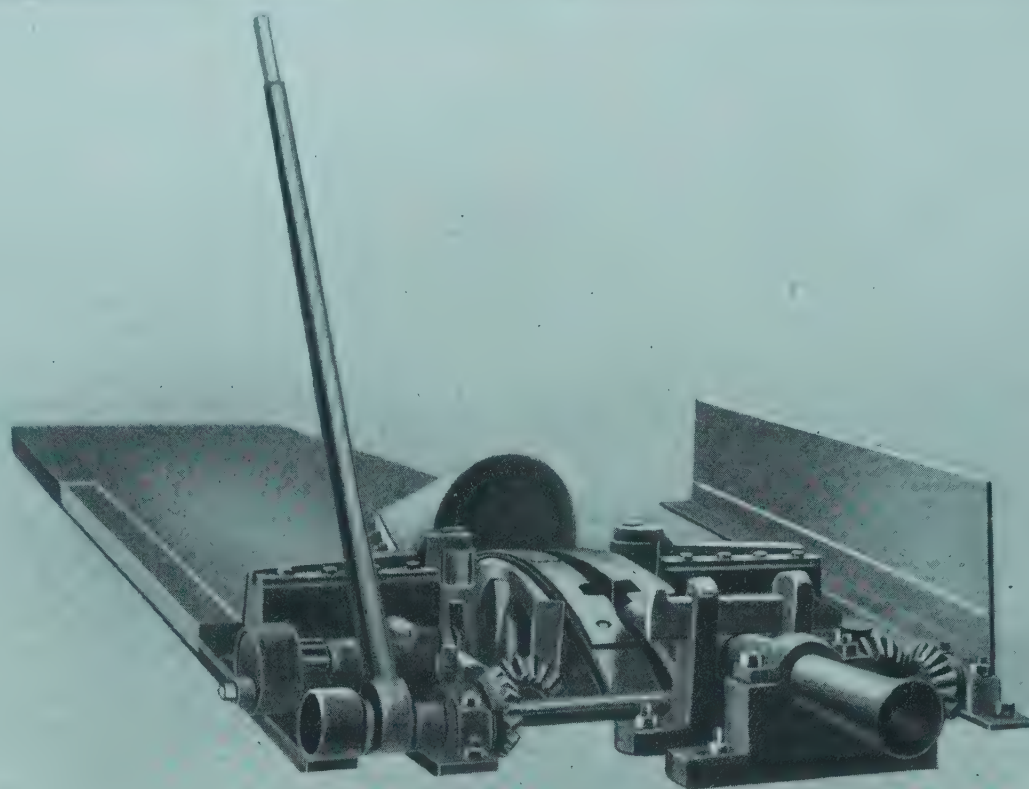


## THE CUTTING, COOLING AND STRAIGHTENING OF MEDIUM AND FINE SECTIONS

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**A**fter leaving the finishing grooves the rolled material generally passes to high speed roller gears erected alongside the hot banks. The oscillating grids of the hot bank lift the bar from the roller gear and transport it piecemeal to the hot bank. These oscillating grids consist of toothed flat iron and are given a vertical movement by an eccentric gearing. As soon as the motion of the grid has brought the cooled bars to the end of the hot bank they are lifted onto the roller gears by means of a pushing device and carried away to the shearing machine where they are cut in bundles to the required lengths. Medium sections are generally cut with a saw, so as to get smooth ends. Behind the shearing machine or the saw it is advisable to erect a roller gear with easily adjustable measuring stop, so as to render it possible to cut the bars quickly and exactly to length. Between the rolls of the roller gear just mentioned a pushing appliance may be erected in connection with the shearing machine, which pushes the material after each cut into a trough grate, from which the bars are carried off by a claw crane. The straightening of crooked round or square iron is often done by hand, whereas for medium sections there are special straightening machines. Hoop iron is mostly transported to the coils by a high speed roller gear worked by rope drive, and there coiled up into long or round bundles.





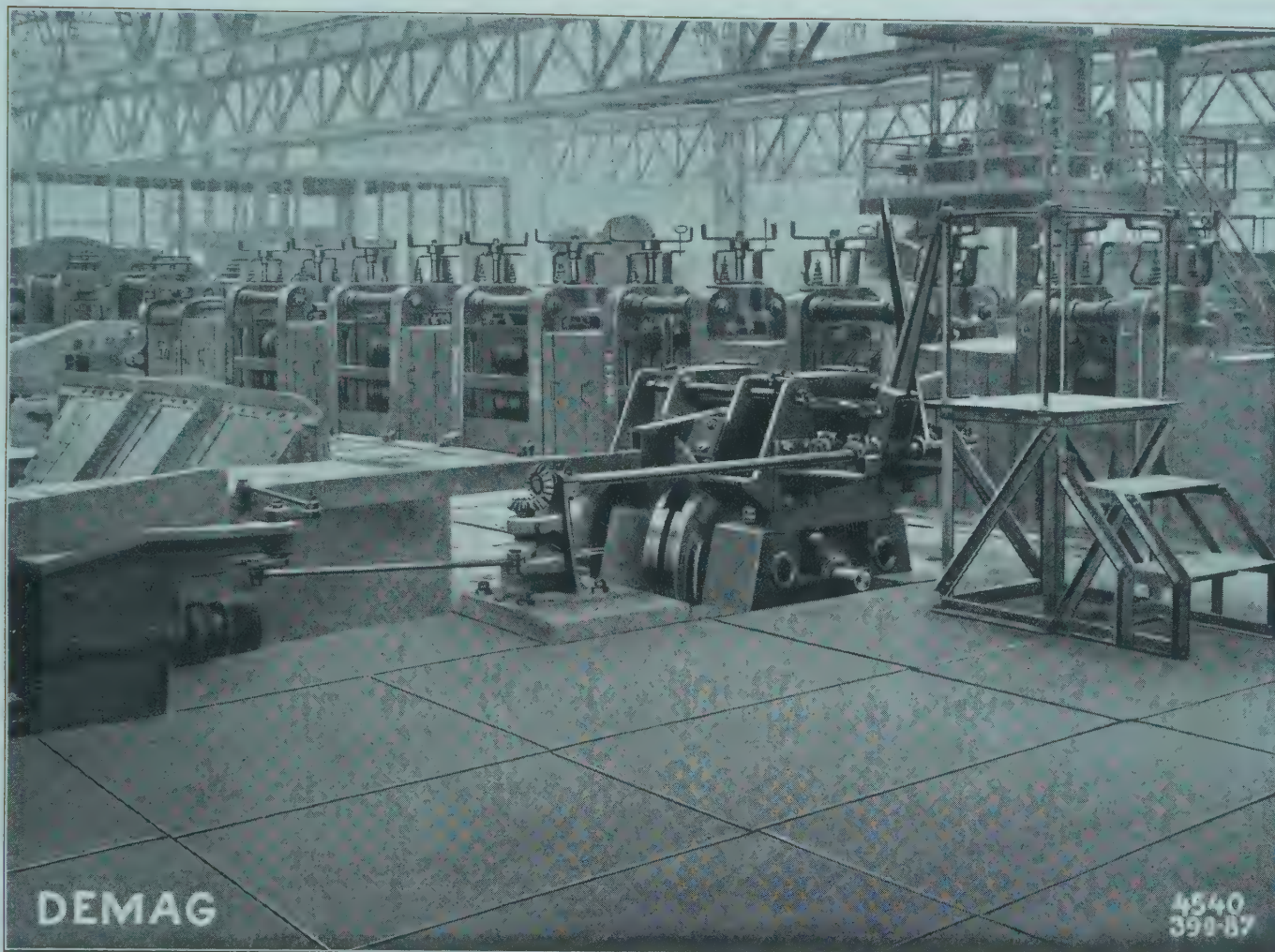
DEMAG

175  
392-7

## ROTARY SHEARING MACHINE FOR CUTTING SMALL SECTIONS UP TO 25 mm. THICK DURING THE ROLLING PROCESS

**T**he shearing machine is driven direct from the rolling mill, which can be done very well by belt transmission. The cut is effected by moving a hand lever, not by a certain part of the revolution. The operator is free to make the cut after any number of revolutions of the cutting disc, i. e., to cut the material into equal or unequal lengths without bending it or jumping the





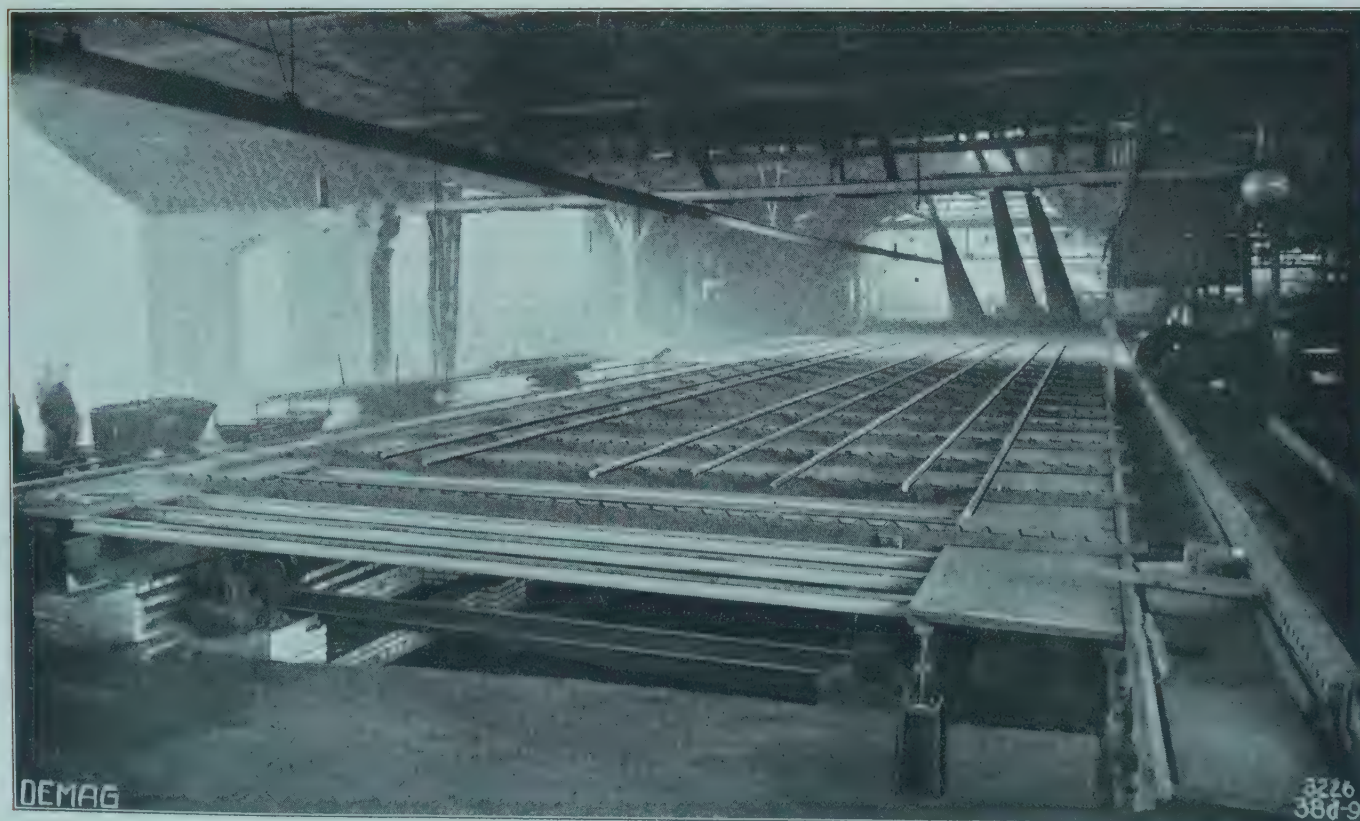
ROTARY SHEARING MACHINE / DELIV. FOR THE VEREIN. HÜTTEN-  
WERKE BURBACH-EICH-DÜDEL., A.-G., WERK ESCH (LUXEMBURG)

ends of the bar, no matter at what speed it may be moving. It is quite unnecessary to adjust the blades or stop the machine when changing from greater to shorter lengths or vice versa. Owing to this property the shearing machine is a valuable apparatus for rolling mills etc., which makes the efficiency of a rolling mill more or less independent of the space at disposal, without any great expense.





Mechanical cooling beds for medium and small sections, oscillating grids raised.



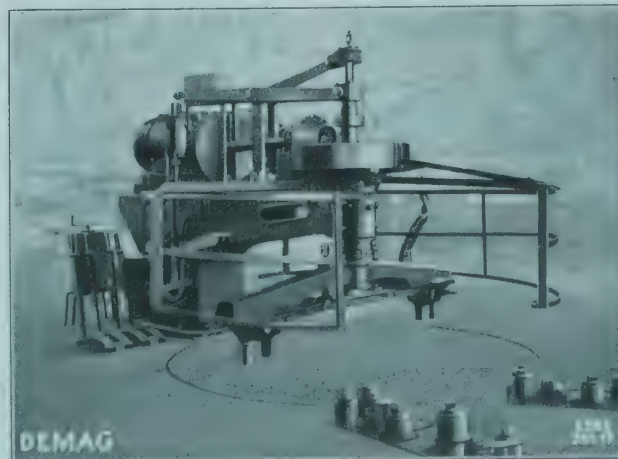




MECHANICAL COOLING BED / DELIV. FOR THE VEREIN. HÜTTENWERKE BURBACH-EICH-DÜDELINGEN, A.-G., WERK ESCH, ESCH AN DER ALZETTE

**T**he material coming from the rolling mill is cut with a rotary shearing machine and passes to the feed roller gear. The oscillating grids grip the bars from below and lift them onto the grate bars. At the end of the grids the material is transferred to the roller gear conveyor by a pushing device.

Hoop iron coil with electric drive, double roller brake and hand shears, for winding long and



round bundles. In order to remove the finished bundles the coil heads are raised.

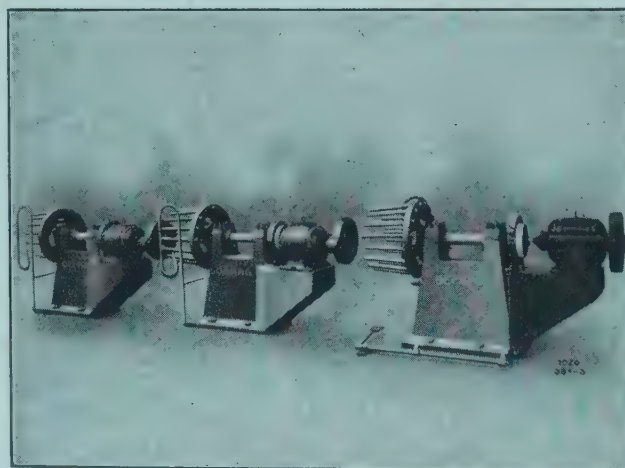




MEDIUM AND SMALL IRON BARS MECHANICAL COOLING BED  
BISMARCKHÜTTE A.-G., DEPT.: FALVAHÜTTE, BISMARCKHÜTTE

## E L E C T R I C S C R A P C O I L

It is driven direct by a motor erected on the coil frame. A foot brake serves for braking the coil when the coiling is finished.



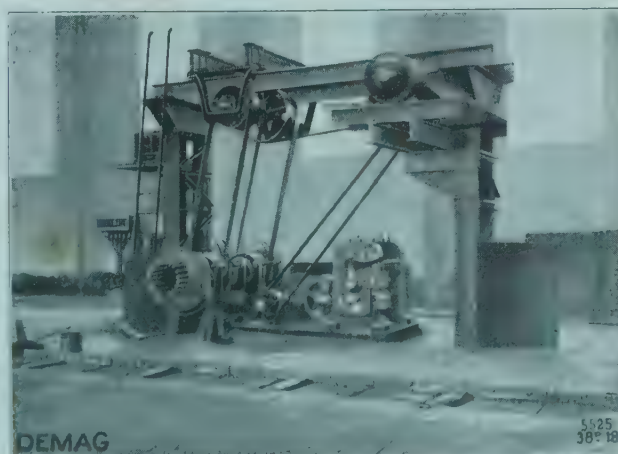




STRETCHING BED FOR MEDIUM AND SMALL SECTIONS / DÜSSELDORFER EISEN- UND DRAHT-INDUSTRIE A.-G. IN DÜSSELDORF

## DOUBLE WIRE COIL WITH POINTING MACHINE

The two sides of the coil and the pointing machine are all driven separately by belting. The coils are fitted with a foot-brake. The pointing machine has pendulum rolls and a shearing machine built into it to cut off the bad ends.







SIX ECCENTRIC SHEARING MACHINES FOR FLAT IRON OF MEDIUM THICKNESS / DELIVERED FOR EISEN- UND STAHLWERK HOESCH, DEPARTMENT LIMBURGER FABRIK- UND HÜTTENVEREIN, HOHENLIMBURG

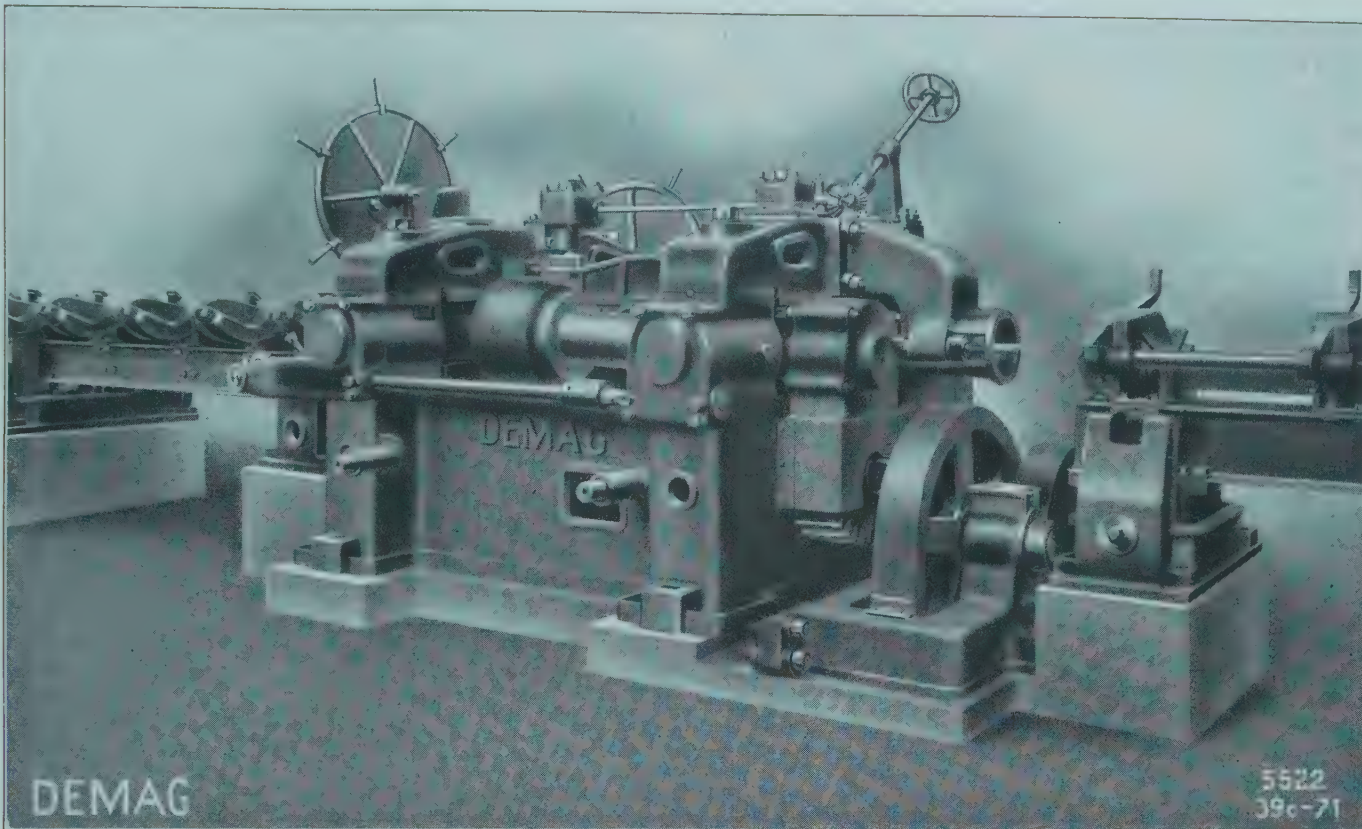
## FLAT IRON SHEARING MACHINE FOR BELT DRIVE



The shearing machine is of the simplest construction with fast and loose pulley

and with belt-shifter, but without disengaging gear for the block holder.

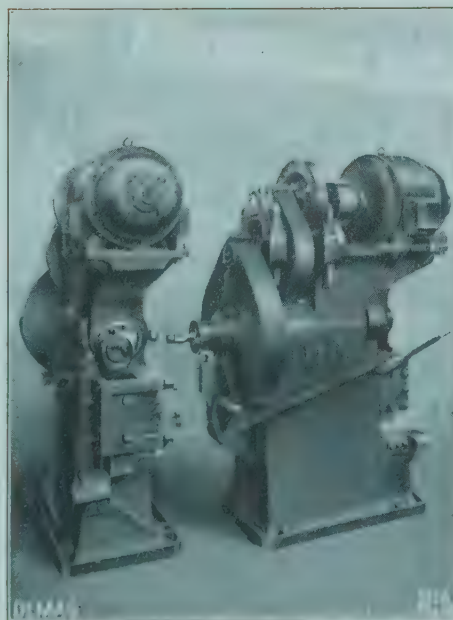




## ROUND IRON STRAIGHTENING MACHINE / DELIVERED FOR THE GUSS-STAHLWERKE POLDIHÜTTE IN KLDNO (BOHEMIA)

**T**his machine serves for straightening warm tool steel up to 130 mm. diameter. The straightening process is done continuously between three rolls, two of which are opposed to the third. The axes of the rolls lie in parallel planes and are inclined towards one another; they are driven by a motor with spur wheels and fitted with hand adjustment. Whilst passing through the rolls the round iron is given a twisting motion and at the same time pushed forward. By this means it is exposed to a thorough process of straightening.

Two electric shearing machines with disengagement by rapid coupling



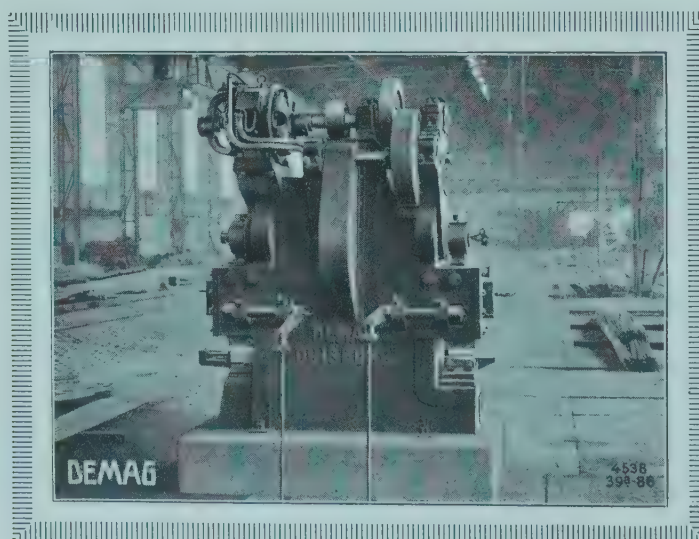
for medium sections. From a photograph taken in the workshop





CLAW CRANE FOR TRANSPORTING MEDIUM AND SMALL SECTIONS  
DELIVERED FOR THE PEINER WALZWERK, AKTIENGESELLSCHAFT, PEINE

DOUBLE SHEARING MACHINE FOR MEDIUM AND SMALL SECTIONS  
ELECTRIC DRIVE / DELIVERED FOR THE DÜSSELDORFER EISEN- U. DRAHT-  
INDUSTRIE, AKTIEN-GES., DÜSSELDORF





# THE LOADING APPLIANCES IN THE MEDIUM AND SMALL SECTION STORES

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**I**n order to load or to pile up in the stores the material coming from the small section mill, similar to the way in which it is done with that from the other section mills, it is necessary to have in the stores devices which forward the large quantities of material delivered from the rolling mill to its proper place both quickly and safely, with as little manual labour as possible. Wherever the space in the straightening shop and the stores is not taken up, by auxiliary machines, waggons or rails, modern concerns have erected hurdle posts with regular subdivisions at suitable distances apart, with hinged cross-bars. This device is our patent. In a horizontal position the cross-bars rest on the stops of the neighbouring hurdle post, whereas in a vertical position they rest against their own hurdle post. The suspension accessories of the special cranes used in workshops thus equipped have a number of specially formed claws on a fixed traverse, the lower bearing lever of which can be rotated about the vertical claw shank and also tipped. From the ends of the bearing lever are suspended safety grippers which prevent the bars from falling off accidentally. If a pile of small sections is to be taken out of the above-mentioned hurdles and loaded, the crane attendant swings the bearing levers of the claws so far round the claw shank from his driver's stand as to bring them into a position parallel to the traverses. With the claws in this position the whole of the suspended portion

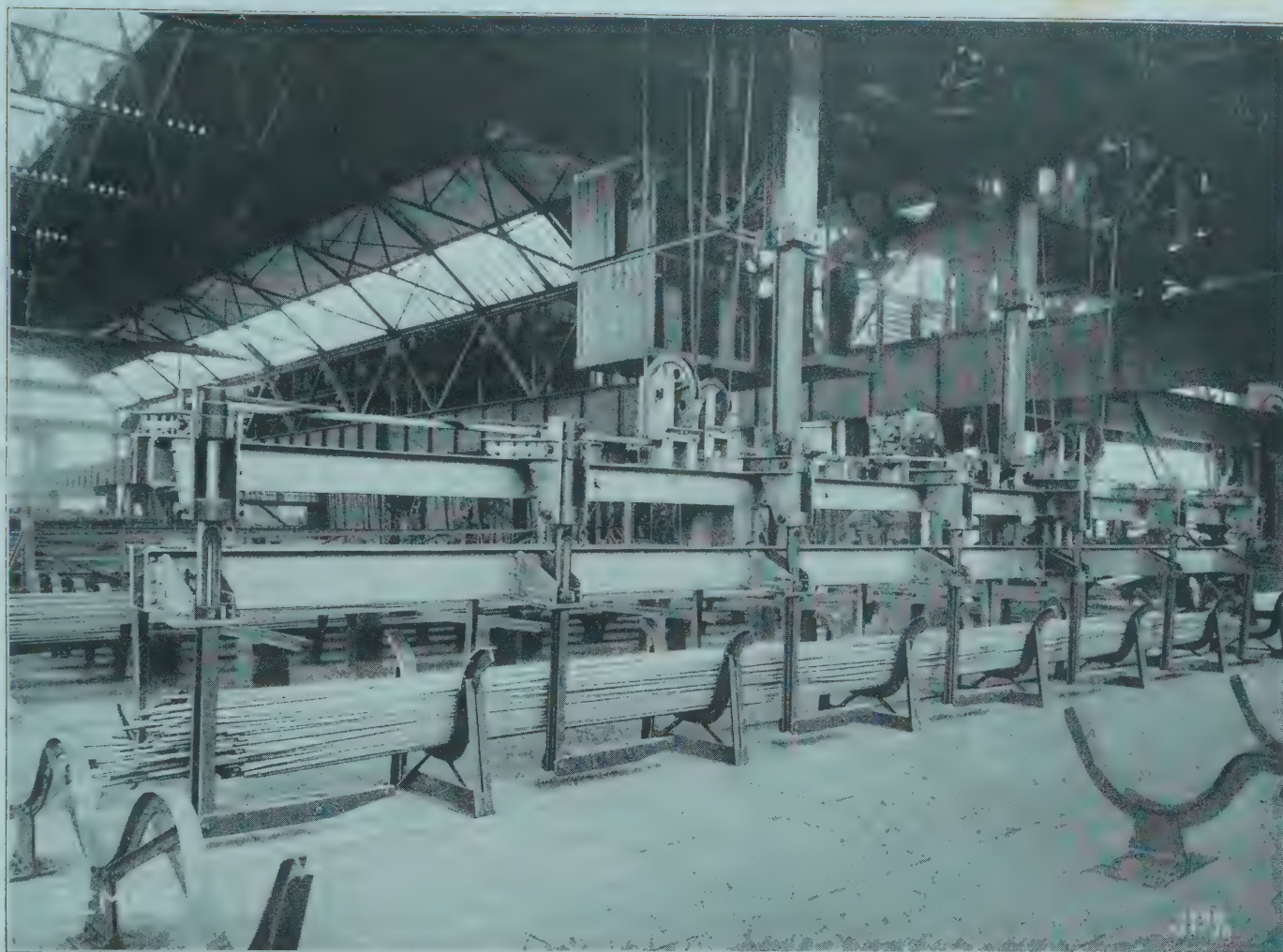




ELECTRIC BAR-IRON LOADING CRANE TO CARRY 5000 KILOS.  
AND WITH A SPAN OF 23 m. / DELIVERED FOR THE BISMARCKHÜTTE,  
AKTIEN-GESELLSCHAFT FÜR EISEN- UND HÜTTENBETRIEB,  
DEPARTMENT FALVAHÜTTE, BISMARCKHÜTTE (UPPER SILESIA)

of the crane is lowered, the claws and the safety grippers falling in the spaces left between the individual piles owing to the width of the hurdle posts. The bearing levers are then swung back to their original position, so that they lie crossways beneath the bar iron and the whole pile can be raised. When lifting the material out of the various stages of the hurdles the supporting arms lying above the bar iron are raised by the latter and remain in this position.

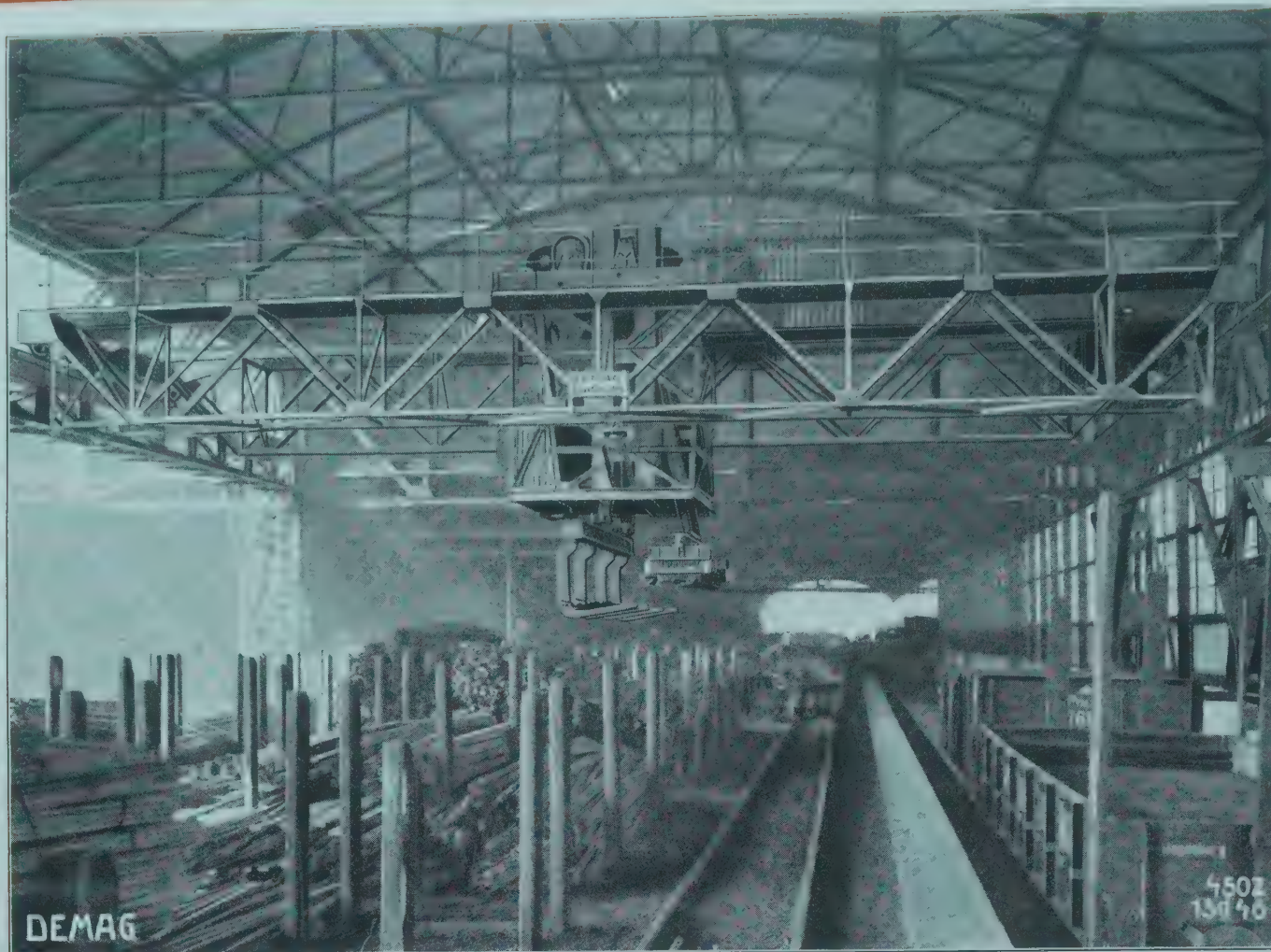




ELECTRIC BAR IRON LOADING CRANE TO CARRY 5000 KILOS.  
AND WITH A SPAN OF 23 m. / DELIVERED FOR THE BISMARCKHÜTTE,  
AKTIEN-GESELLSCHAFT FÜR EISEN- UND HÜTTENBETRIEB,  
DEPARTMENT FALVAHÜTTE, BISMARCKHÜTTE (UPPER SILESIA)

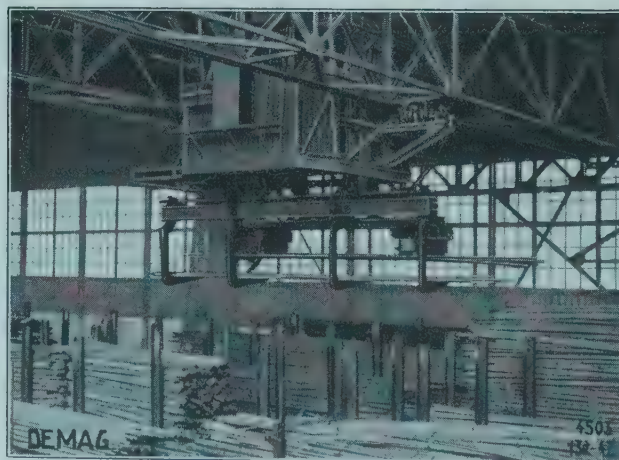
The iron is deposited in the railway waggon by tilting the claws, the safety grippers being raised at the same time sufficiently to leave an opening large enough for the bars to pass through. The crane illustrated on page 184 also has a collector at one end of the bearing lever, so as to enable it to convey two piles of bars at the same time. In connection with such cranes there is often a gauged weighing appliance which weighs and registers the load lifted.



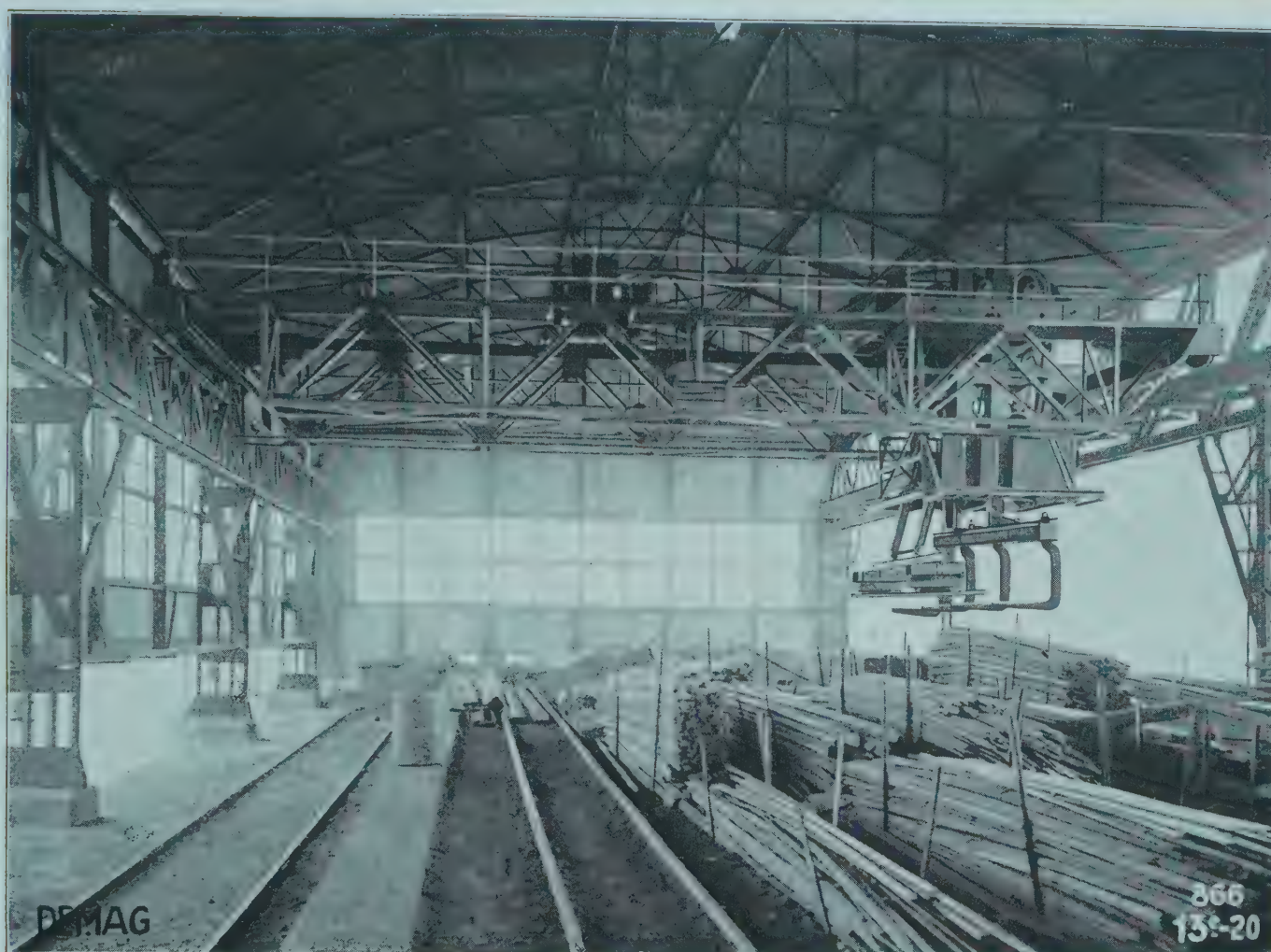


## ELECTRIC BAR IRON LOADING CRANE WITH MAGNETS, MAGNETS DISENGAGED

The lower illustration shows the same bar iron loading crane with the magnets thrown into gear. The lifting capacity of the crane is 5000 kilos and its span 15.35 metres. The crane was delivered to the Lothringer Hüttenverein Aumetz-Friede, Kneuttingen (Lothringen).







## ELECTRIC BAR IRON LOADING CRANE WITH FIXED ROTATING AND TILTABLE CLAWS

In the above crane the loading of the claws is effected by rigid magnets capable of being thrown over. Delivered to the Lothringer Hüttenverein Aumetz-Friede, Kneuttingen (Lothringen). The illustration below shows an overhead travelling crane over a bar iron stores.





## ELECTRIC BAR IRON LOADING CRANE



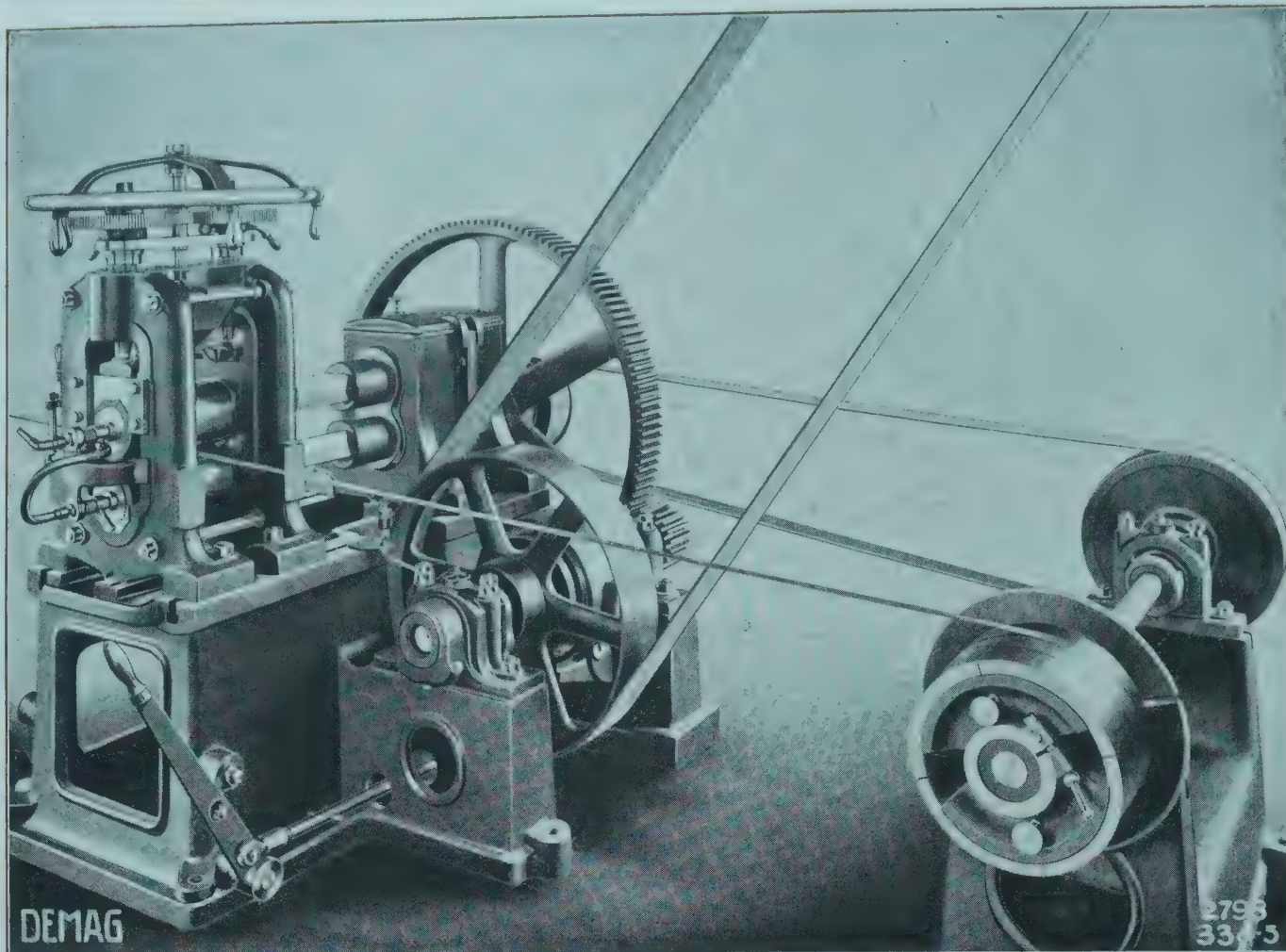
TO CARRY 5000 KILOS. AND WITH 23. m SPAN  
Delivered for the Bismarckhütte, A.-G. für Eisen- und Hütten-  
betrieb, Department Falvahütte, Bismarckhütte (Upper Silesia).





**C**old rolling mills are generally used for the manufacture of long and so-called endless hoops of steel, iron, brass, copper, lead, zinc, tin, aluminium, gold, silver etc. Such hoops are required of the most varied widths and thicknesses for use in the electrical and cable industry, stamping works, metal works etc. In addition to these hoop iron for packing cases is also made with cold rolling mills, as well as section wires and section bars of small cross-section, section rolls being used in place of smooth ones. Hoops of precious metals and of brass etc. are made almost exclusively by the cold process. The cast pig bloom is first worked in a cogging mill and the strip thus obtained is then stretched to the desired degree of fineness in a hoop rolling mill. Iron and steel hoops are first rolled warm, and taken to the cold rolling mill in the necessary thickness and widths, generally 1 mm. thicker than the desired dimensions of the finished article. Then they are rolled to size cold in the cold rolling mill. As a rule, before passing through the finishing process the rough rolled strips of metal are trimmed at the edges by circular saws, or divided into several narrow strips. But this work can also be done whilst being rolled for finishing, or, if thought desirable, the strips can be cut to the desired width at the very last. The same applies also to the manufacture of iron and steel hoops. On corrugation rolling mills the raw material from the iron and steel works is corrugated and rolled into loose rings, as the raw hoop is covered with scale, which has to be removed before passing to the cold rolling mill by pickling in salt or sulphuric acid. In this way care is taken to get the pickling liquid to act uniformly on the material also from the sides. We construct cold rolling mills for belt or direct electric drive. Besides these rolling mills we also deliver all the auxiliary appliances needed in a cold rolling works. We draw attention to our special catalogue, "The Cold Rolling Mill".



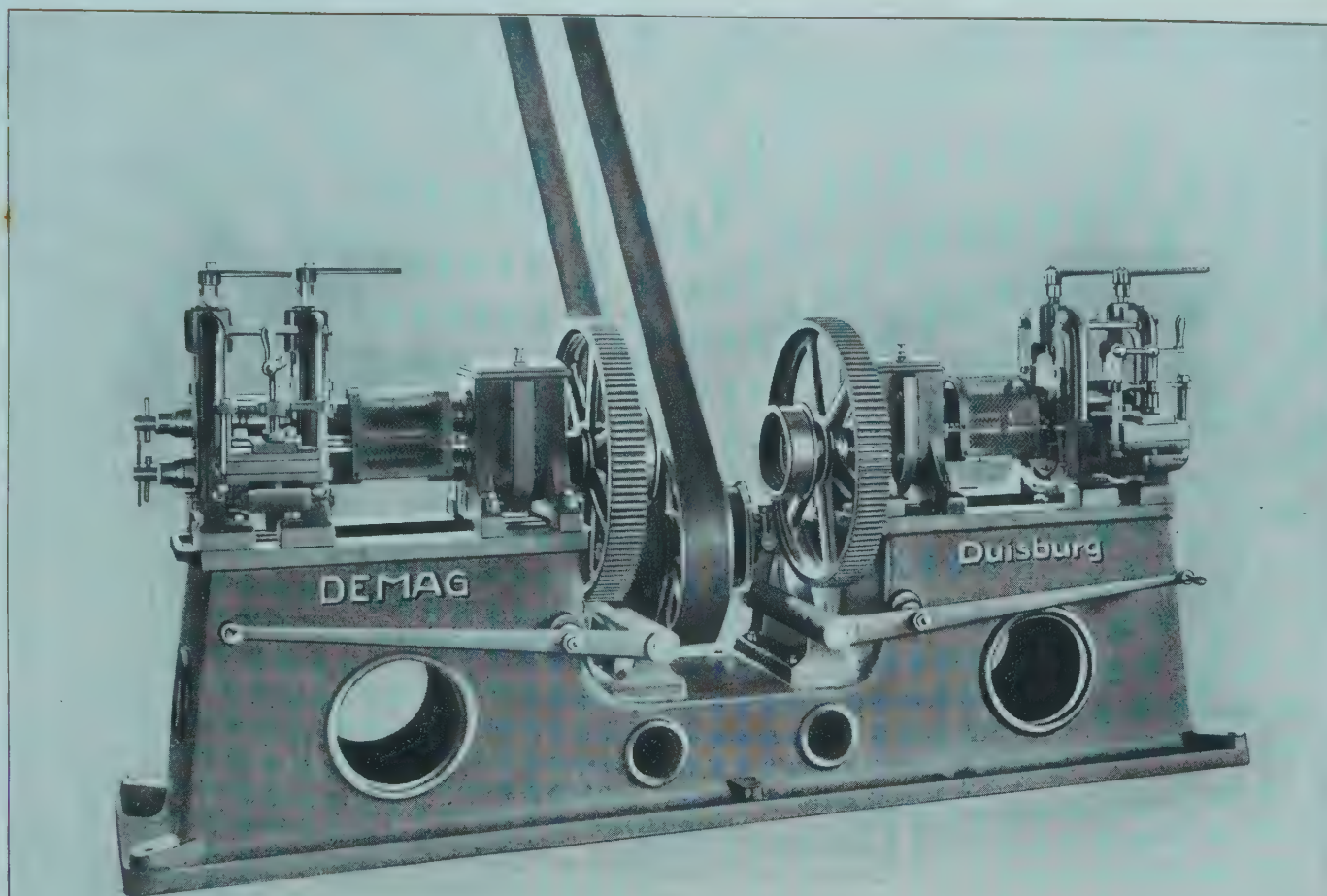


**COLD ROLLING MILL WITH BELT DRIVE AND SIMPLE COUNTER-SHAFT**  
 ..... LARGE NUMBERS MADE .....

Cold rolling installation for hoops, total plant about 50 machines. The illustration shows part of the cold rolling works of the Metallwarenfabrik Robert Zinn & Co., G. m. b. H., Barmen-Rittershausen.







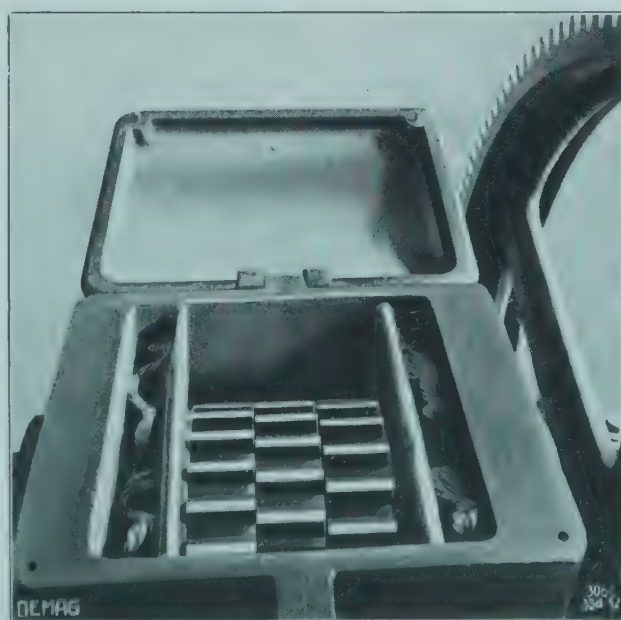
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DOUBLE COLD ROLLING MILL WITH BELT DRIVE AND TWO COUPLINGS  
 ..... LARGE NUMBERS MADE .....

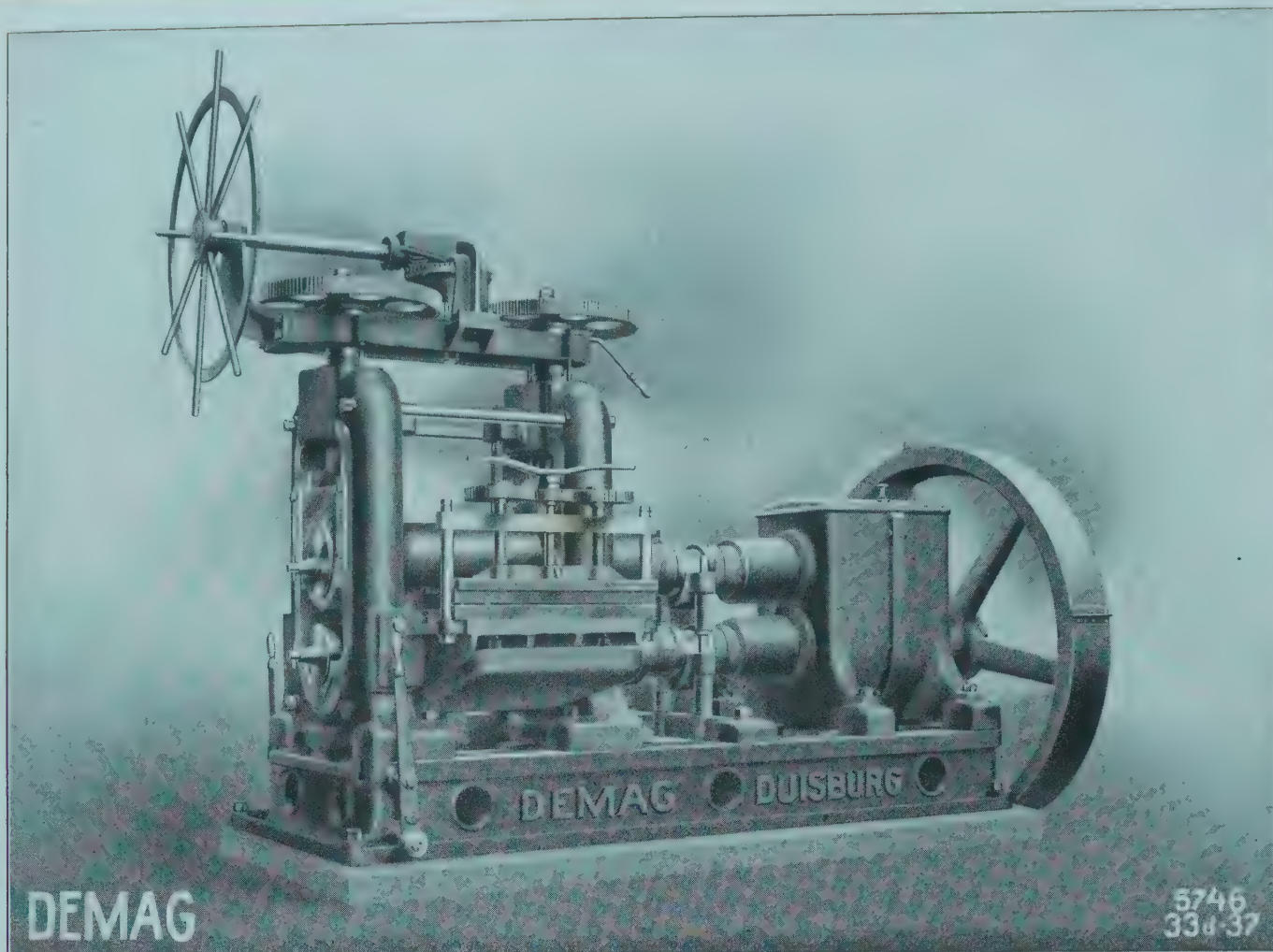
At our works at Wetter-Ruhr, where we construct cold rolling mills in workshops specially equipped for this purpose there are always series of the most varied types ready or in course of construction, so that delivery can be made without loss of time.

Pinion housings opened, with syphon lubrication.



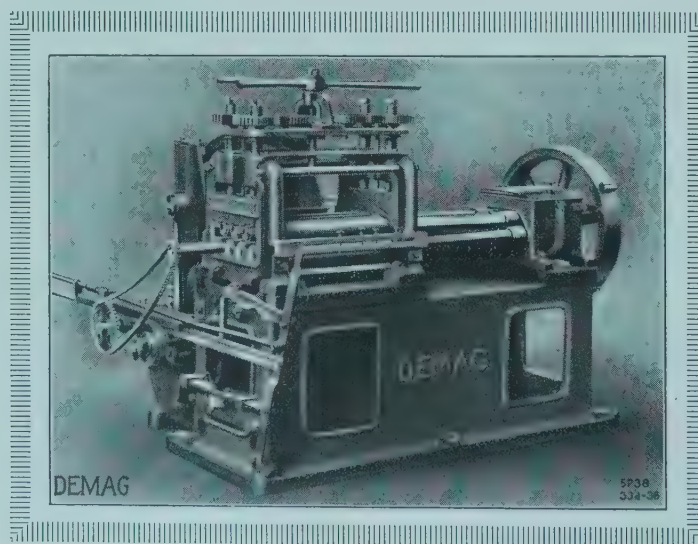
Threefold alternating teeth to guarantee smooth running.



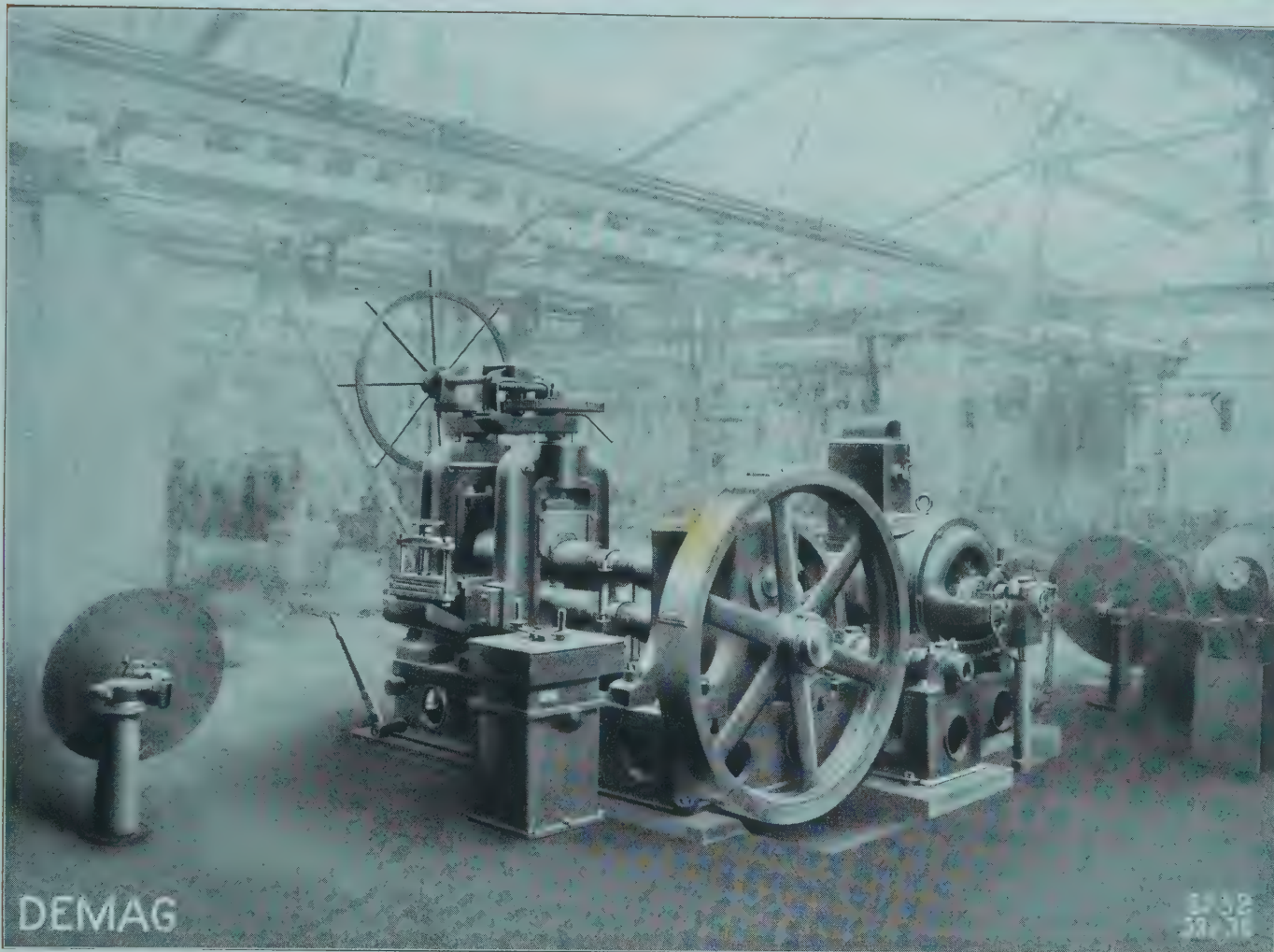


COLD ROLLING MILL FOR SPECIAL PURPOSES, WITH ROLLS  
350 mm. IN DIAMETER AND A BARREL LENGTH OF 650 mm.  
DELIVERED FOR BERGMANN-ELEKTRICITÄTS-GESELLSCHAFT, BERLIN

MACHINE FOR STRAIGHTENING METAL HOOPS, WITH AUTOMATIC  
CUTTING DEVICE (FRONT VIEW)

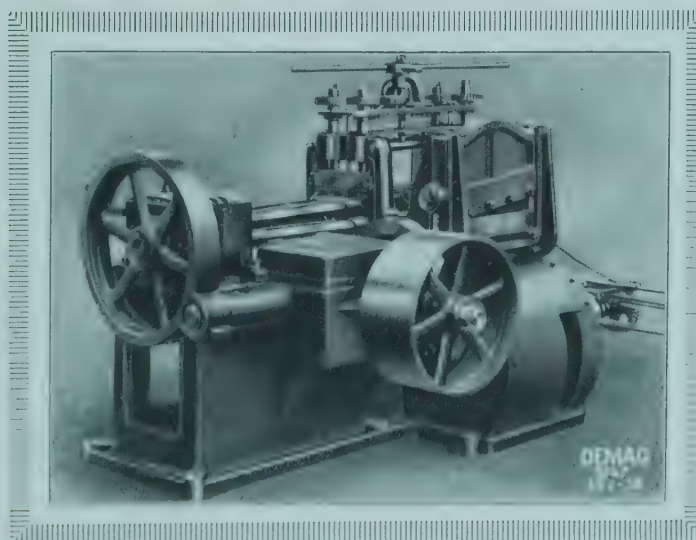




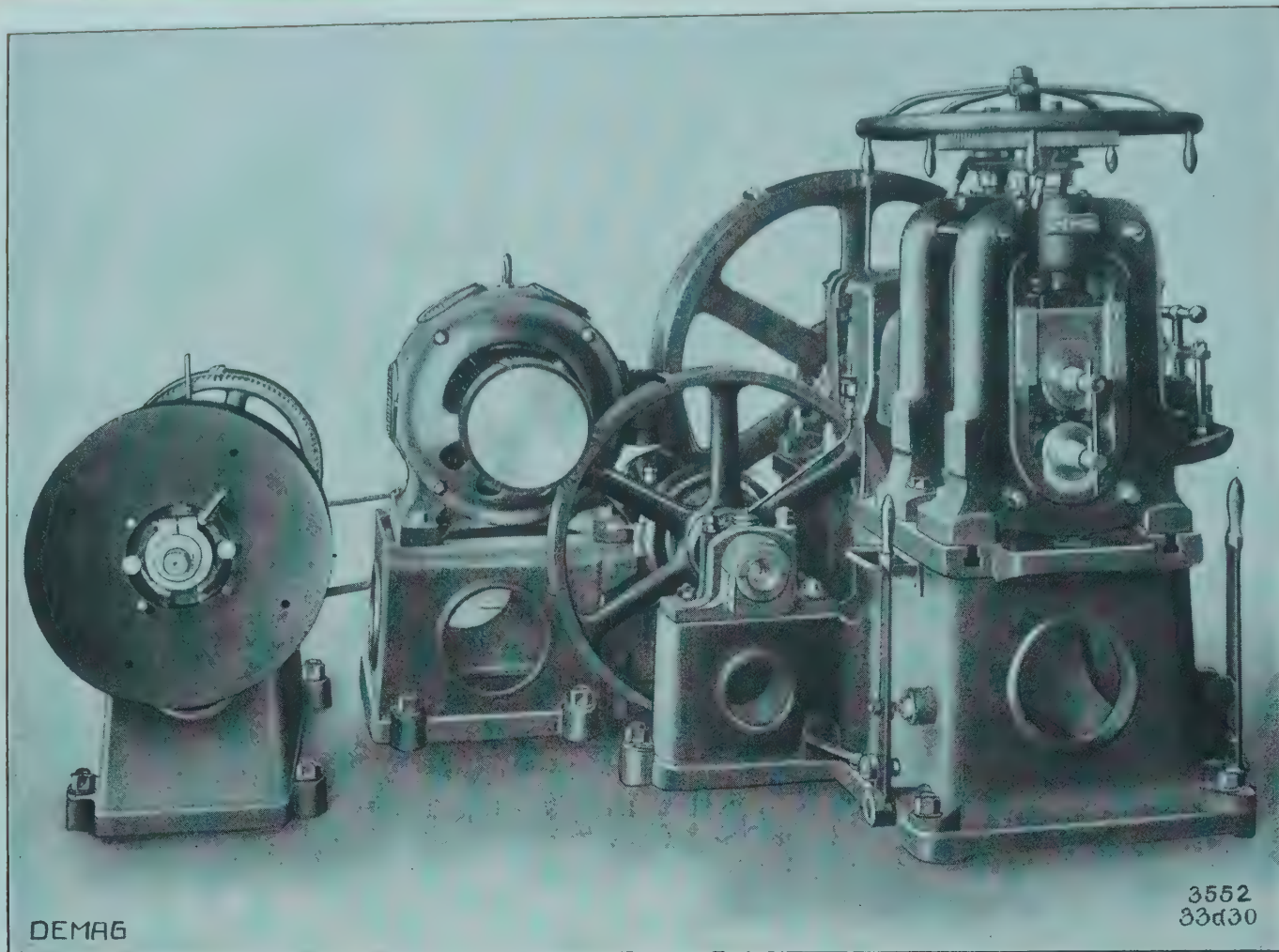


COLD ROLLING MILL WITH DIRECT MOTOR DRIVE WITH ROLLS  
250 mm. IN DIAMETER AND 400 mm. BARREL LENGTH / DELIVERED  
FOR ROBERT ZINN & CO., G. M. B. H., BARMEN-RITTERSHAUSEN

MACHINE FOR STRAIGHTENING METAL HOOPS, WITH AUTOMATIC  
CUTTING DEVICE (BACK VIEW)

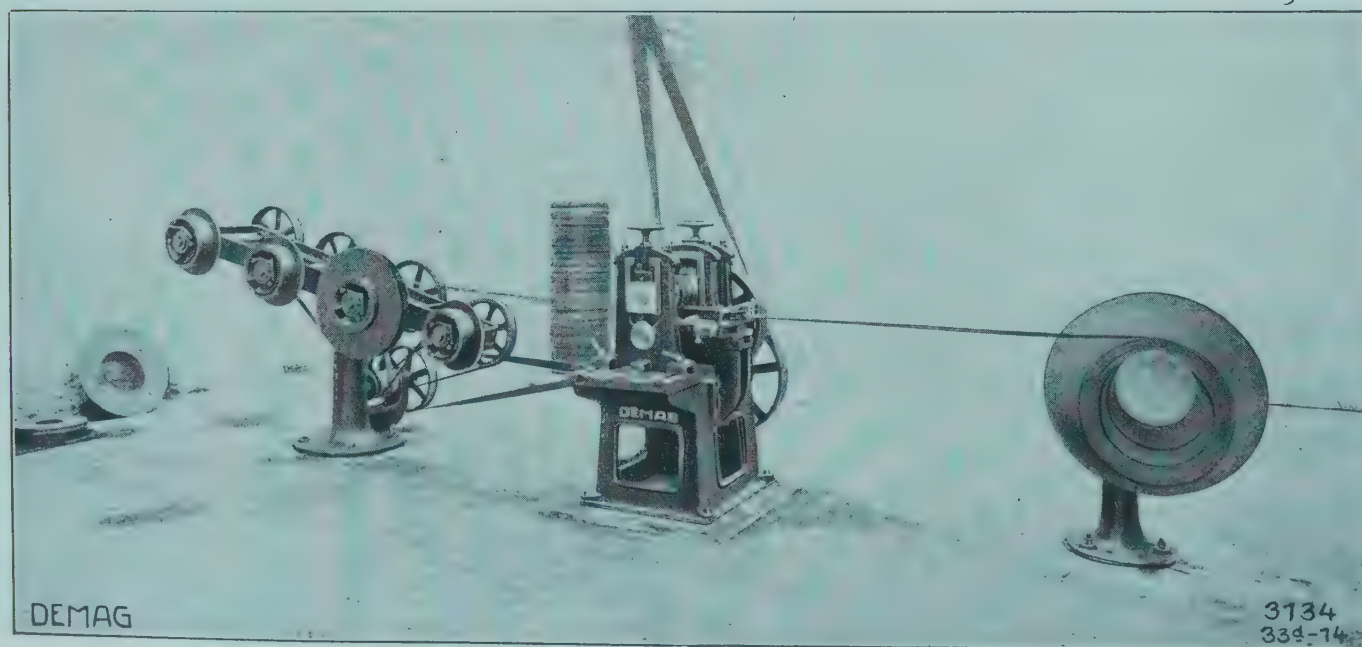




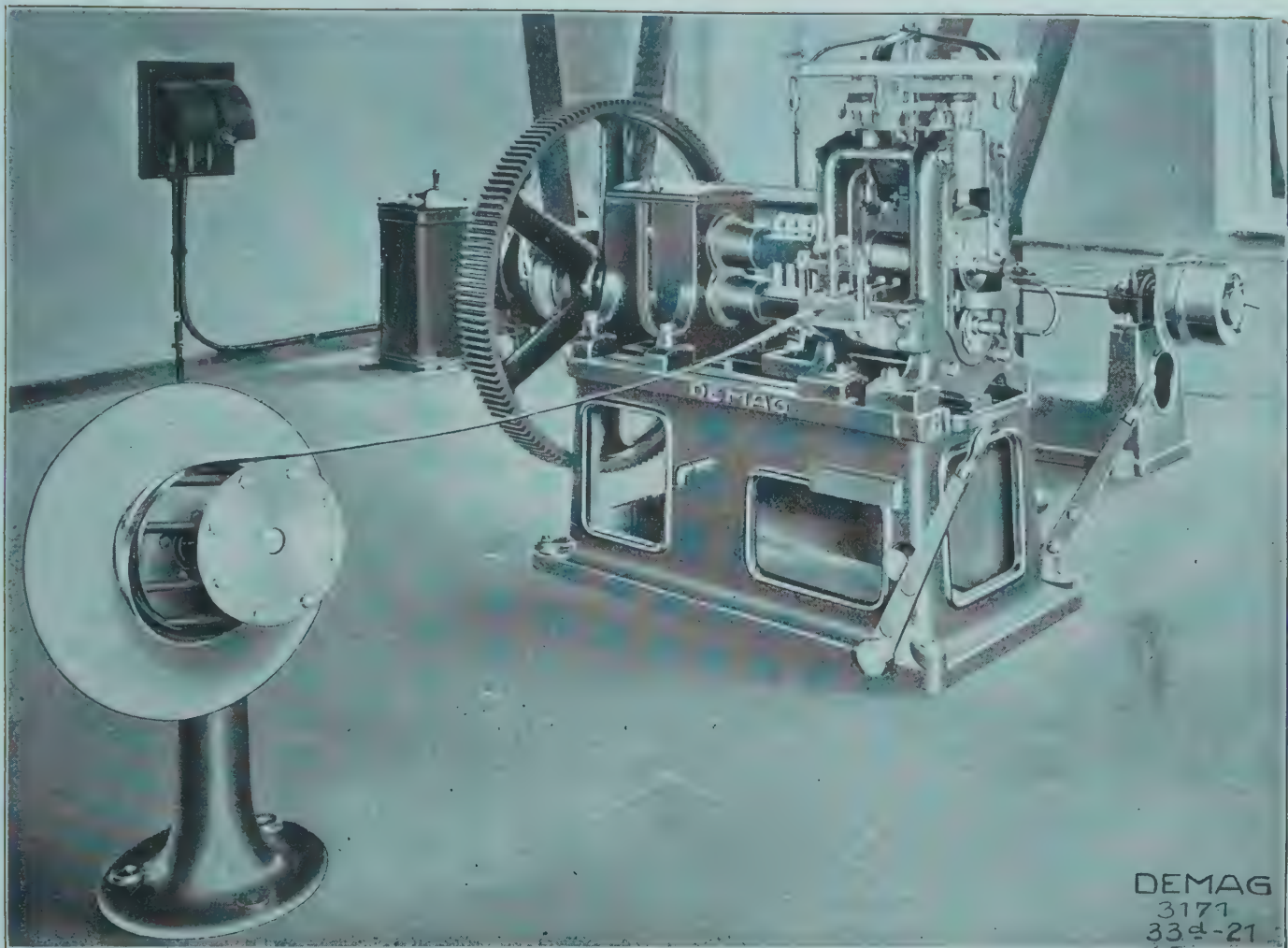


COLD ROLLING MILL, WATER COOLING (REGISTERED PATTER)

CIRCULAR SAW WITH COIL, SHOWING THE CUTTING OF HOOPS

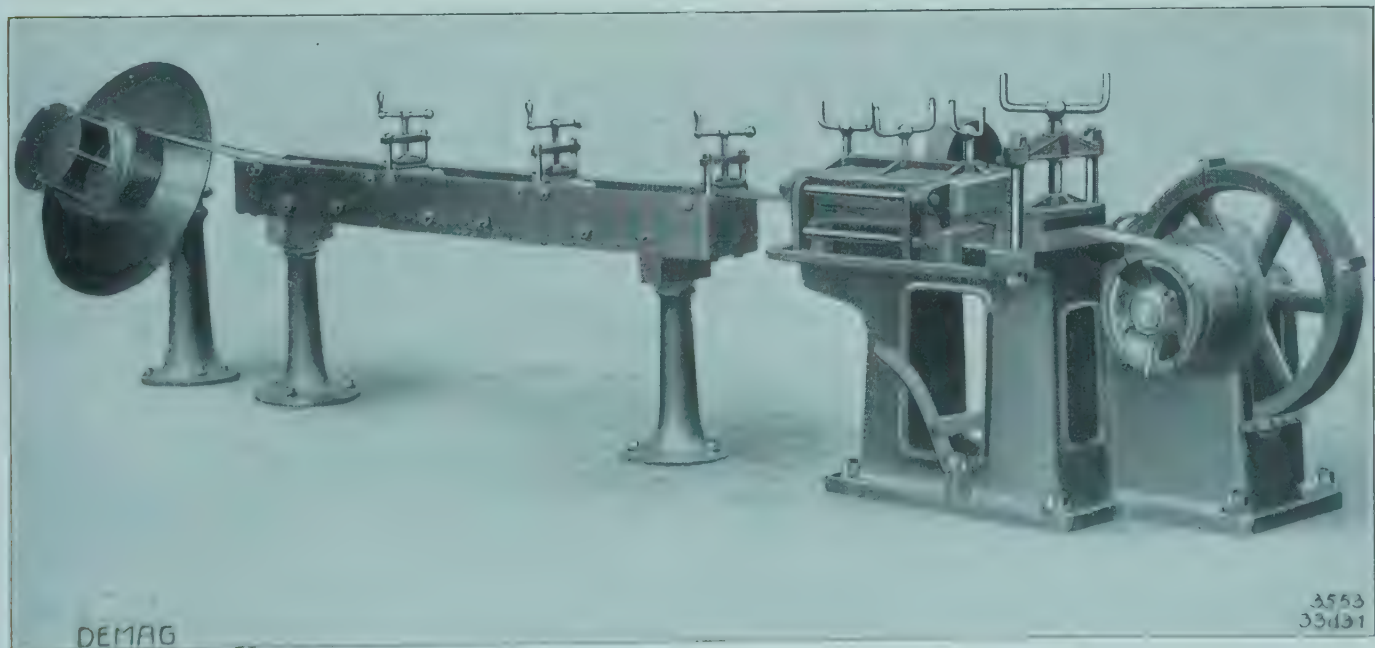






COLD ROLLING MILL WITH COILING DEVICE

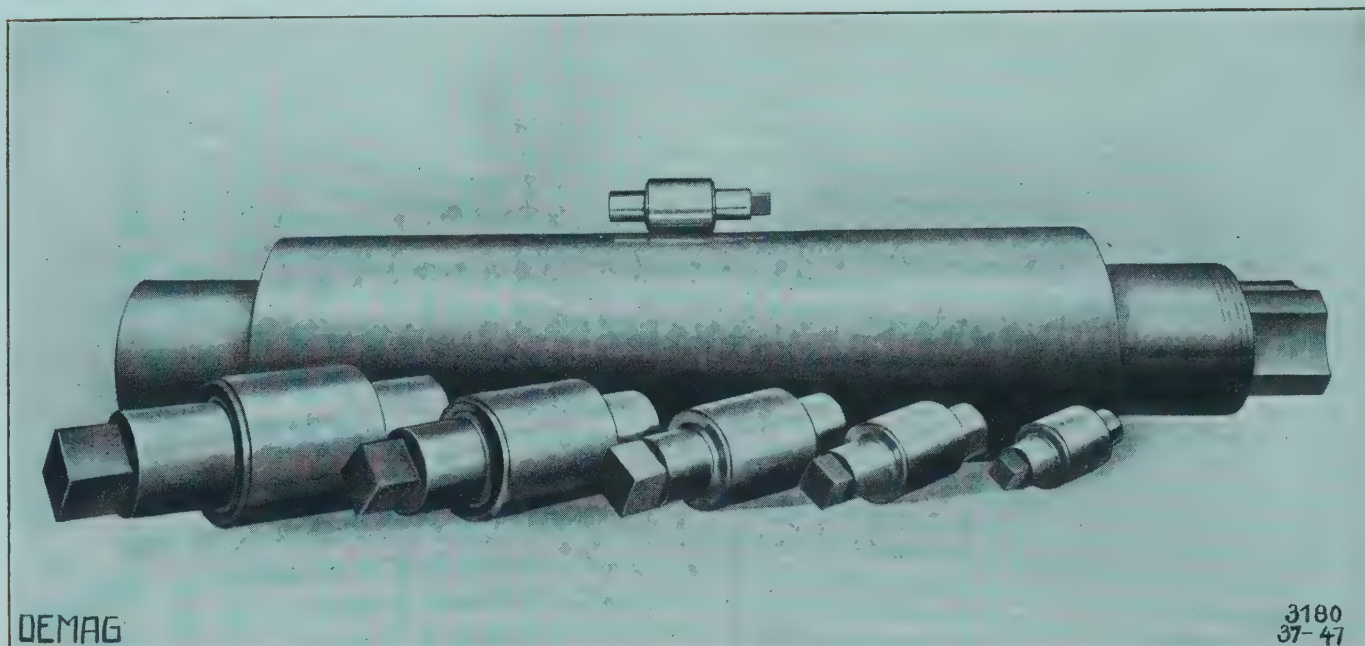
CLEANSING MACHINE FOR CLEANING AND GREASING HOOPS





# HARDENED AND POLISHED CAST STEEL ROLLS

**T**he rolls constitute an important part of each cold rolling mill, and in our workshops these are made of the most suitable crucible steel, hardened and polished. We deliver the rolls not only for the machines of our own manufacture but also of all dimensions with or without water cooling device, according to sketch,



which must be sent in. Our rolls are noted for their great, deep-going hardness and have thoroughly stood the test in the hardest worked rolling mills, such as hoop and spring steel rolling mills. The barrel of the rolls may be smooth and, if specially desired, highly polished, or they may be given a design or profile according to patterns delivered by the customer. We draw particular attention to our section rolls, such as are used for rolling section wires, turbine vanes etc. For our hardened steel rolls we guarantee good tempering and freedom of the material from faults for a period of twelve months working ten hours a day, or six months working double shift.





**W**ire mills are used for making iron, steel, copper wire etc. of the usual thicknesses, mostly round, seldom of a square cross-section. After being rolled the wire is coiled up into bundles on special winding machines. These winding machines differ according to the quantities and cross-sections of the wire to be coiled up. For small quantities the simple coil with horizontal reel is used, for larger quantities the so-called Edenborn or Garrett coil with vertical winding drum. The two last-mentioned systems are erected immediately behind the finishing mill and driven from the rolling mill by belt transmission, so that the speeds of winding and rolling are always in conformity, even in cases of variable speed, and all tearing or jumping of the wire avoided. The simple coils, on the other hand, are erected at some distance from the wire mill and driven separately, of late mostly by electricity. Old-fashioned wire mills, in which the output was often 30000 kilos or even less, consisted of one blooming mill housings, a cogging mill and a finishing mill, the latter arranged in one line, when cast pig blooms were to be rolled, or of a cogging mill consisting of one or two housings and a finishing mill, when the material to be rolled had already been cogged. The arrangement of the finishing mill in one line has its disadvantages. A natural consequence of the diminution of the cross-section and the consequent increase in the length of the rolled material was that the speed of the rolls should be correspondingly increased, which was possible with all the housings in one line only within certain limits, by the gradation of the diameter of the rolls. For technical reasons, however, the diameter of the rolls in wire mills ought never to exceed 290 mm. The finishing mill therefore began to be divided into groups, which were made to run at different speeds. The advantage thus gained is that within each group the diameters of the rolls can be graded much

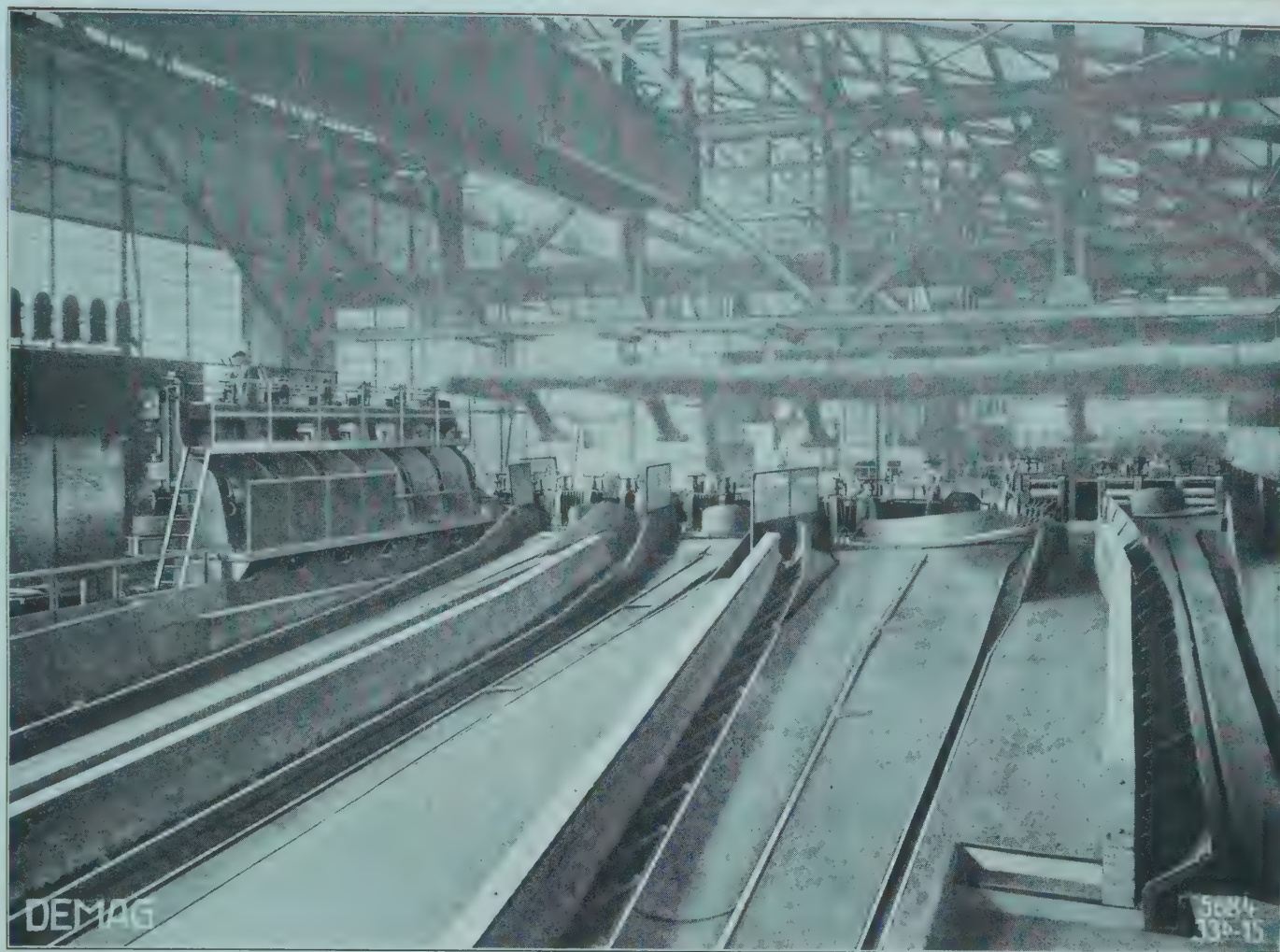


more on account of the small number of housings, the consequence being that the length of the loops between the individual housings is kept as short as possible, so that the material to be rolled is not cooled down so much. Further advantages of this subdivision are:

1. The power required for the work of rolling is transmitted by several spindle housings. ....
2. When the finishing mill is divided into two groups the small number of revolutions enables the first group to be used as the small mill and the second group to be disengaged altogether. ....
3. The number of revolutions can be greater than when the finishing mill is all in one line, because for the larger cross-sections in the first group the permissible speed of the rolls is limited, and cannot be so high as for the smaller cross-sections. ....
4. The output is considerably increased, especially if automatic guides are employed, because in the housings of the second group the rolls can be given a much higher speed. ....

After the introduction of so-called improvements the cogging mills hitherto in use were no longer able to keep pace with the output possible with such a graded finishing mill, so that for a large production it was also necessary to make suitable alterations in the cogging mills. An increase in the production was attained by arranging several housings in the cogging mill, the rolling being shared by several housings. But even such cogging mills did not suffice, for besides the fact that the material cooled down too quickly for the long rolling process they had also the further disadvantage of requiring a comparatively large number of workmen. But the longer rolling process also required more power. These evils have now been entirely removed by the application of continuous cogging mills. The continuous cogging mills enable a maximum output. The material reaches the finishing rolls much warmer, the result being that the rolled material is far more exact and the wear and tear of the rolls is decreased. In the following pages we show a few of the wire mills of which we have constructed large numbers for firms both at home and abroad.

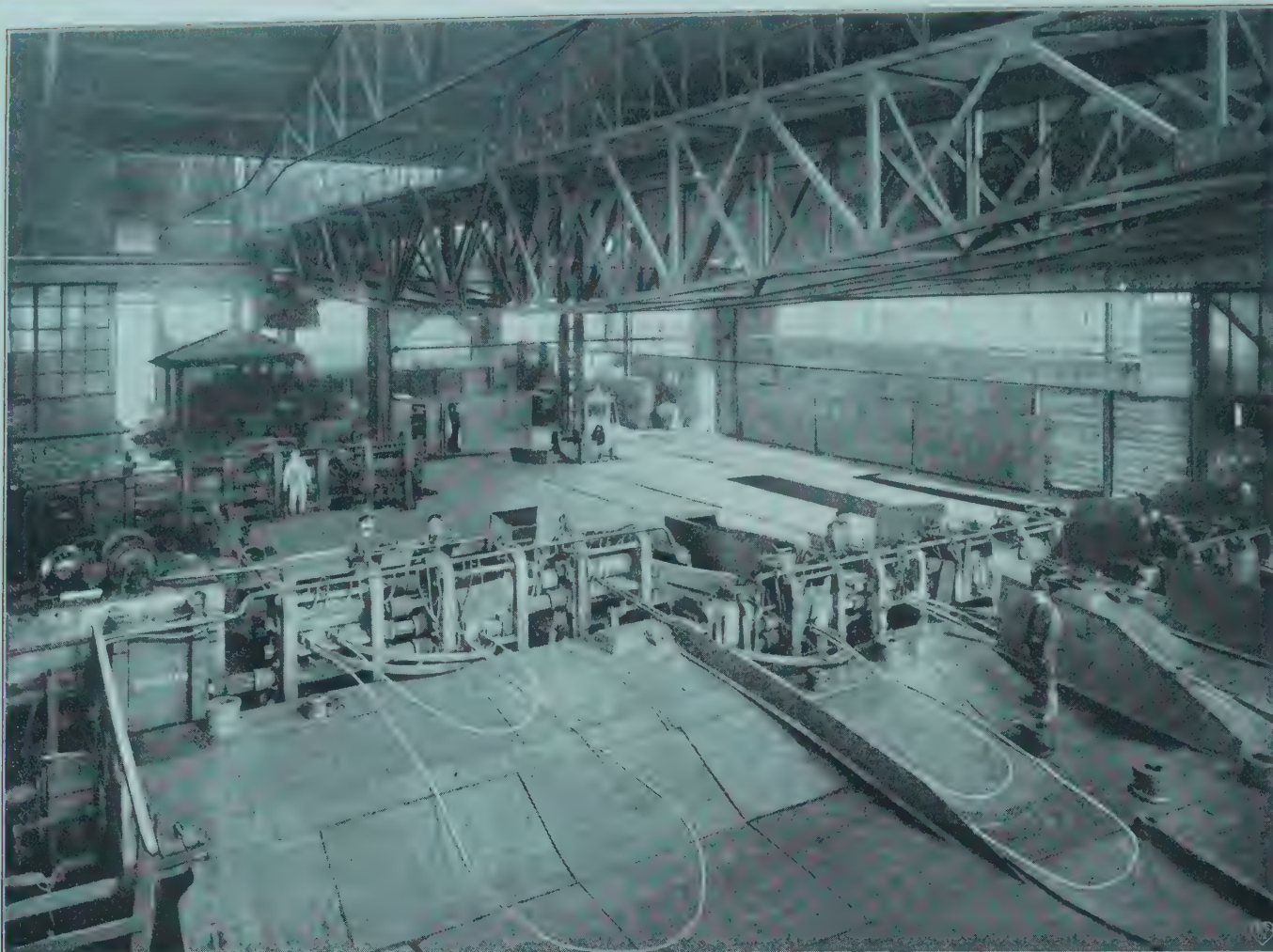




MODERN WIRE MILL FOR A BIG OUTPUT / DELIVERED FOR A LARGE STEEL WORKS ON THE LOWER RHINE

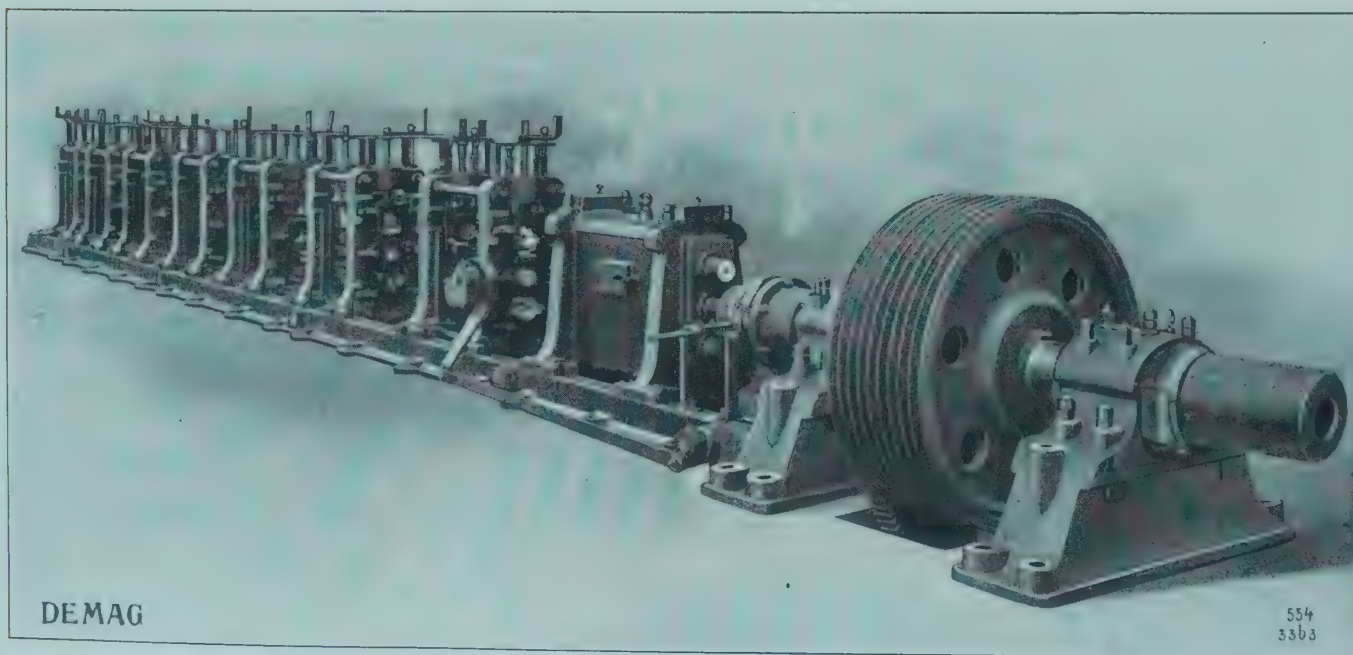
**T**he mill consists of a continuous cogging mill of six housings, a second cogging mill of eight housings, in which two more housings are coupled to the last one, and a standard finishing mill consisting of six housings. Between the first and second continuous cogging mills five shearing machines have been erected, which cut the rolled material to lengths. The wire leaving the mill is wound by Garrett coils, seven in number. By means of a special transporting plant the wire is conveyed to an automatic cooling bed for wire bundles, where the bundles are cooled and then loaded. The plant was erected for a guaranteed output of 150 tons in 10 hours, but outputs of 250 tons and more have frequently been obtained in this time.





WIRE MILL FOR AN OUTPUT OF 80 TONS PER SHIFT / DELIVERED FOR THE DEUTSCH-LUXEMBURG. BERGWERKS- UND HÜTTEN-A.-G., DIFFERDINGEN

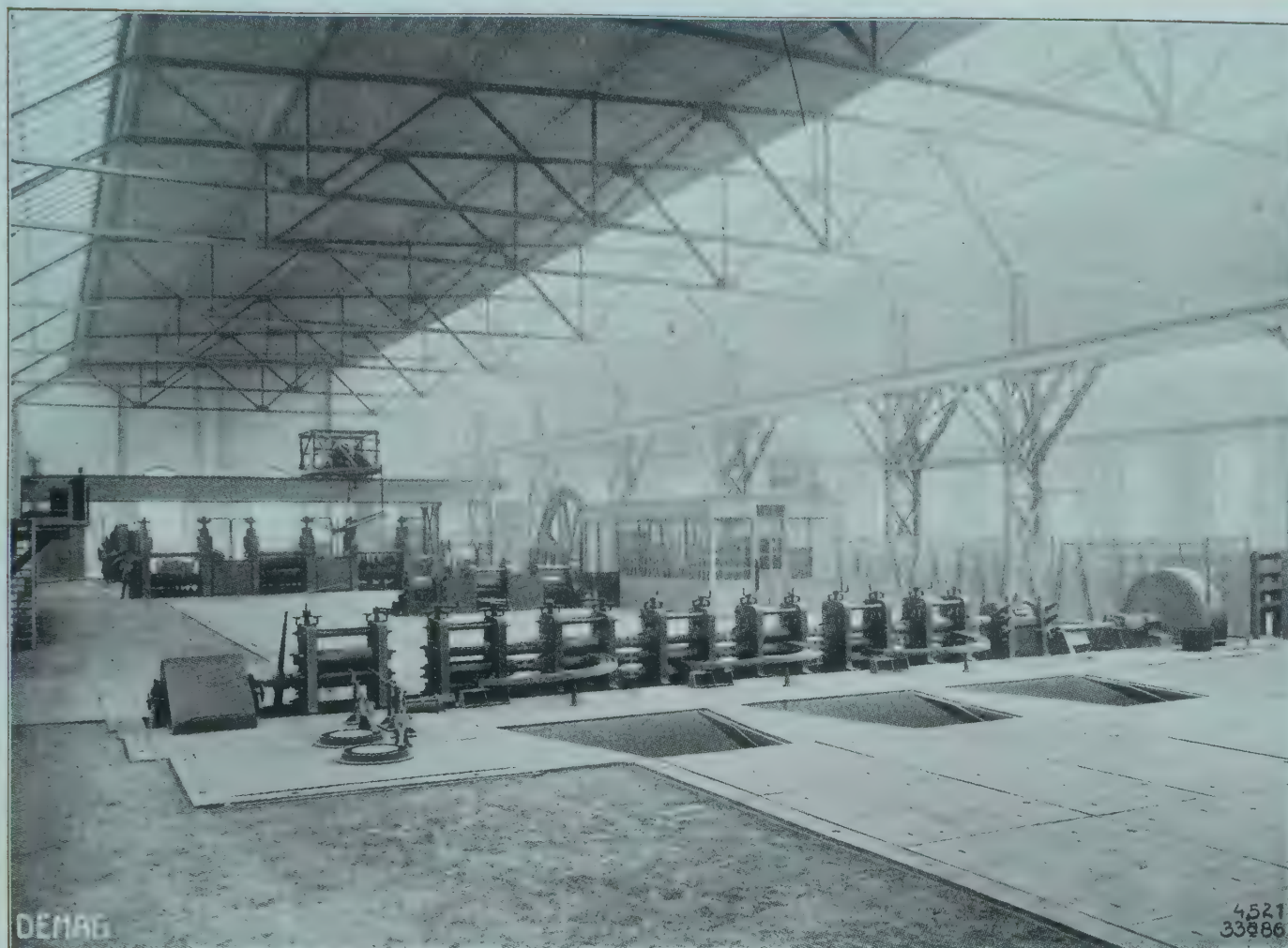
WIRE MILL WITH ROPE (FROM A PHOTOGRAPH TAKEN IN THE WORK-SHOP) / DELIVERED FOR THE BERGMANN-ELEKTRIZITÄTWERKE, BERLIN



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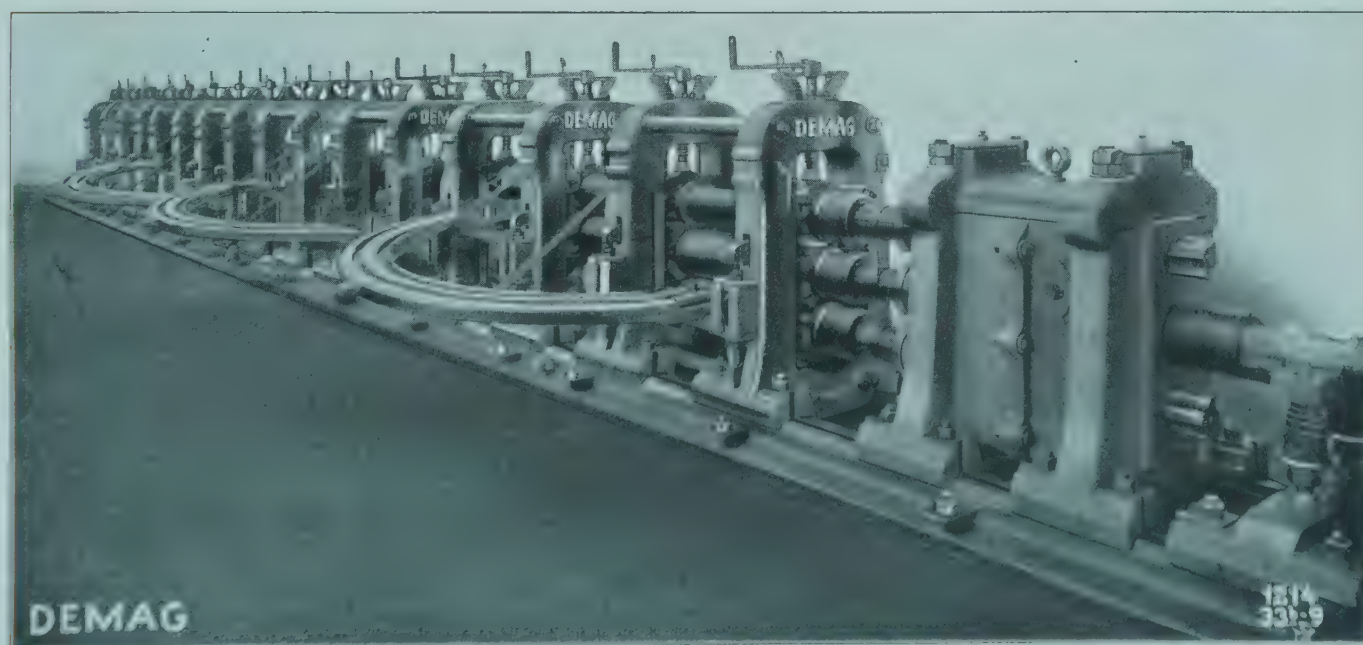
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WIRE MILL CONSISTING OF SEVEN HOUSINGS / DELIVERED FOR THE STAHLWERKE BECKER AKTIEN-GESELLSCHAFT, WILlich nr. KREFELD

WIRE MILL WITH AUTOMATIC GUIDES / "PHÖENIX" AKT.-GES. DÜSSELDORFER RÖHREN- UND EISENWALZWERKE, DÜSSELDORF







WIRE MILL / DELIVERED FOR THE KUPFERWERK  
DEUTSCHLAND A.-G., OBERSCHÖNEWEIDE nr. BERLIN

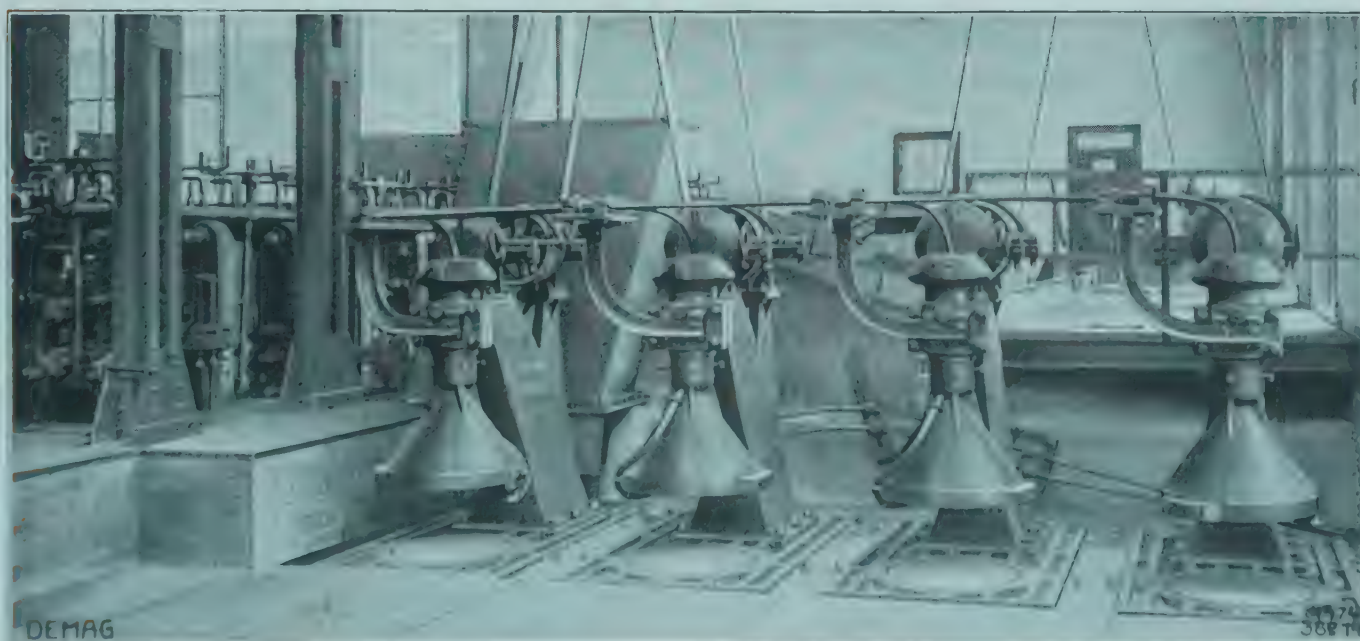




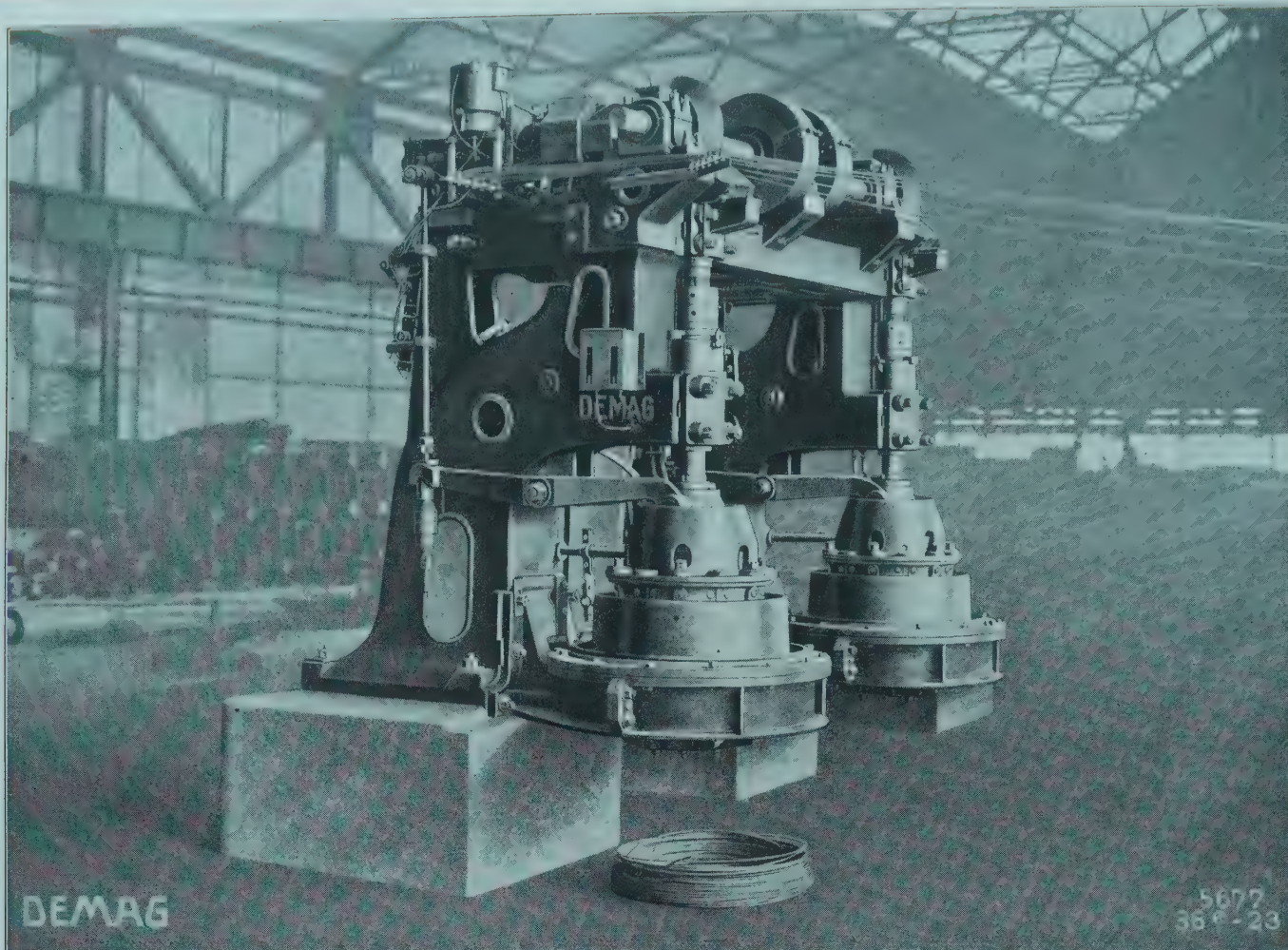


FOUR WIRE COILS / DELIVERED FOR THE DEUTSCH-LUXEMBURGISCHE BERGWERKS- UND HÜTTEN-AKT.-GES., DIFFERDINGEN (LUXEMBURG)

WIRE COIL FOR A COPPER WIRE MILL FOR THE KUPFERWERK DEUTSCHLAND AKTIEN-GESELLSCHAFT, OBERSCHÖNEWEIDE nr. BERLIN



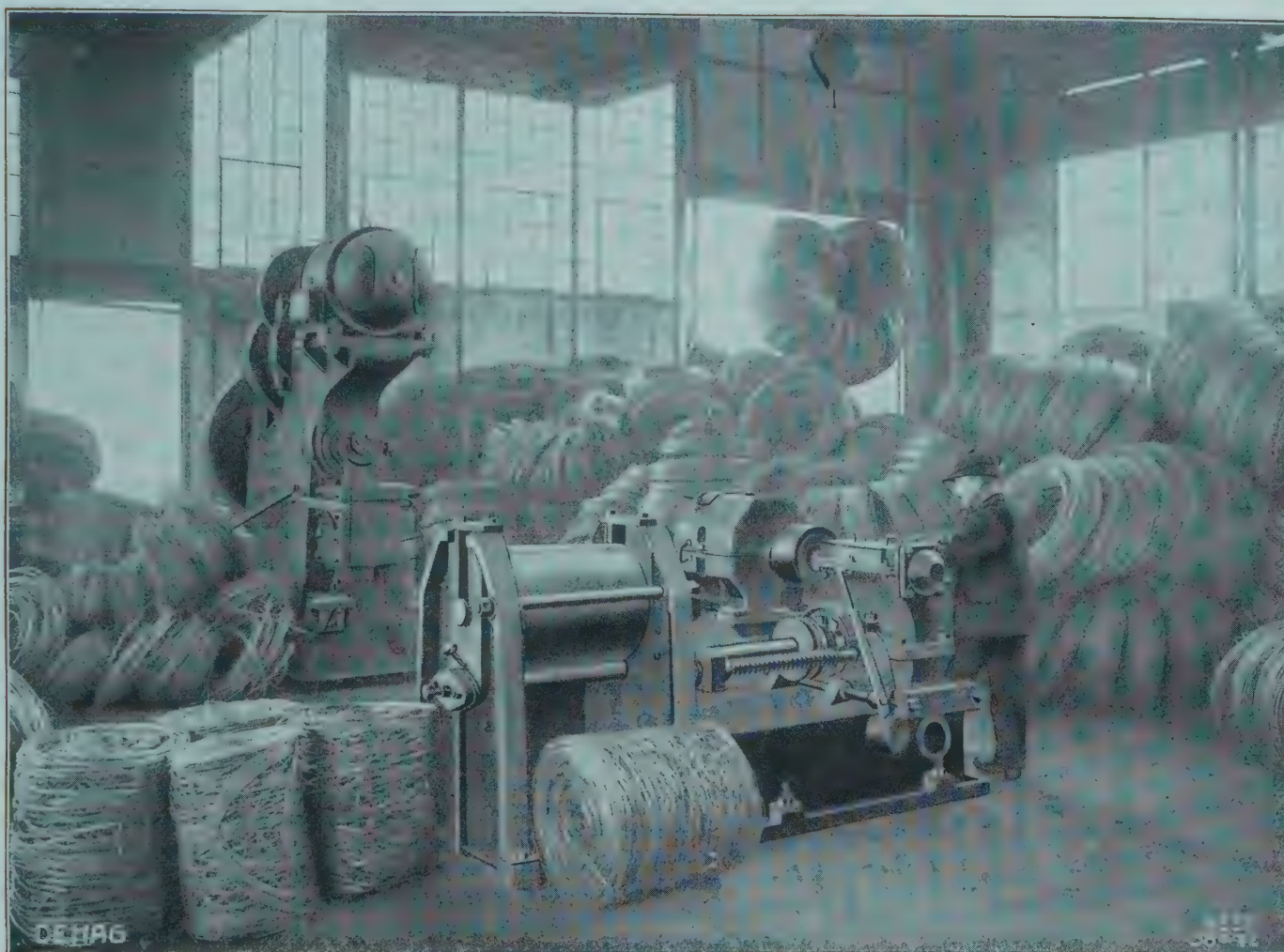




TWO WIRE COILS / DELIVERED FOR THE LOTHRINGER HÜTTEN-  
VEREIN AUMETZ-FRIEDE A.-G., KNEUTTINGEN (LOTHRINGEN)

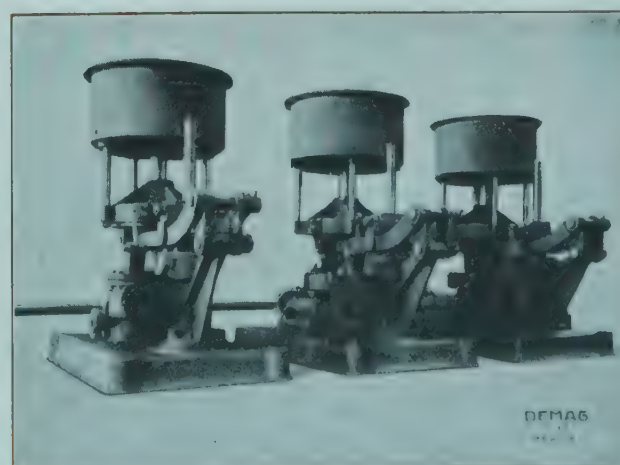
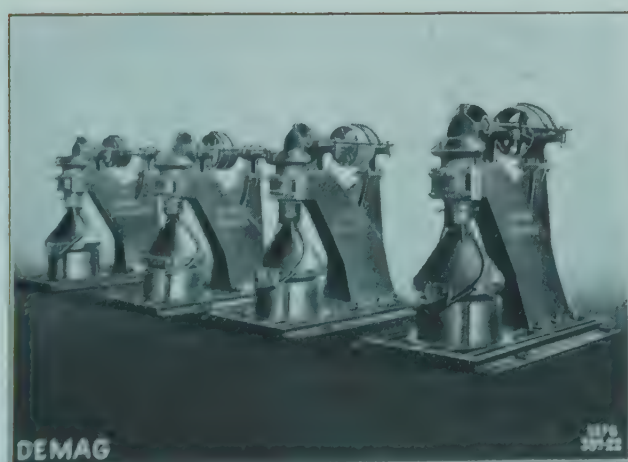
**T**he above illustration shows two coils which we delivered for the Lothringer Hüttenverein Aumetz-Friede in Kneuttingen (Lothringen). These coils are specially adapted for sectioned and hard steel wire, because the wire is not twisted. The starting and stopping of the winding box and the discharging of the bundles of wire when rolled is effected in each coil by means of a small motor. The coils are constructed for belt drive and have winding boxes of a patented construction for two different diameters of wire bundles.





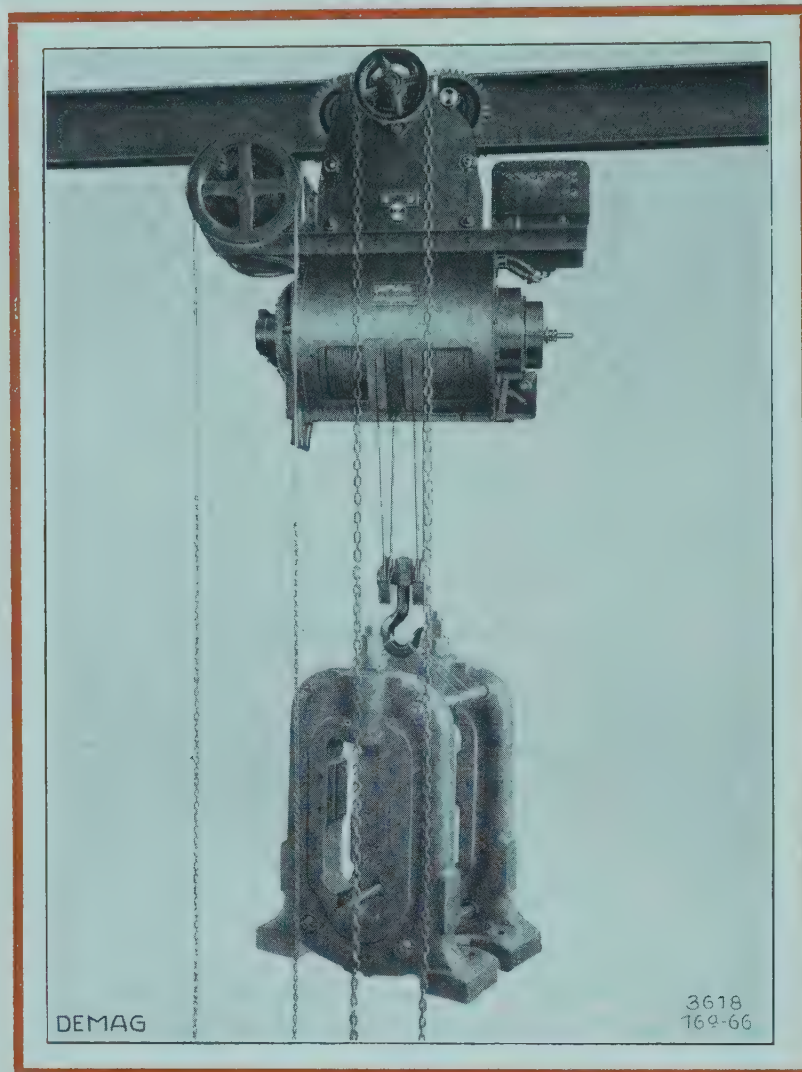
ELECTRIC WINDING MACHINE FOR WIRE SCRAP  
 ..... SEVERAL MADE .....

EDENBORN WIRE COILS AND UNDERGROUND WIRE COILS WITH  
 STEAM DISCHARGING DEVICE FOR DISCHARGING THE BUNDLES  
 WHEN ROLLED (FROM A PHOTOGR. TAKEN IN THE WORKSHOP)



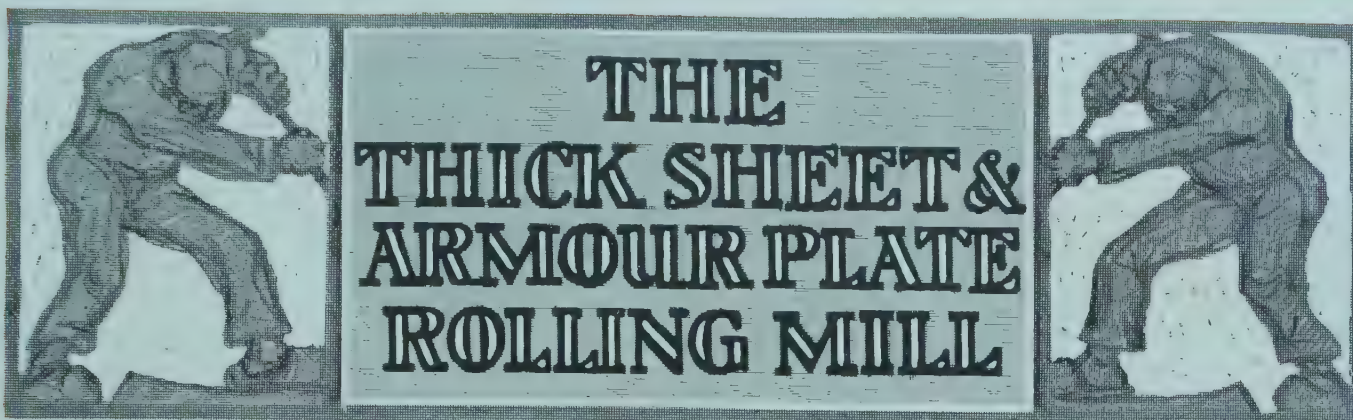


## ELECTRO-PULLEY BLOCK



## DEMAG PATENT

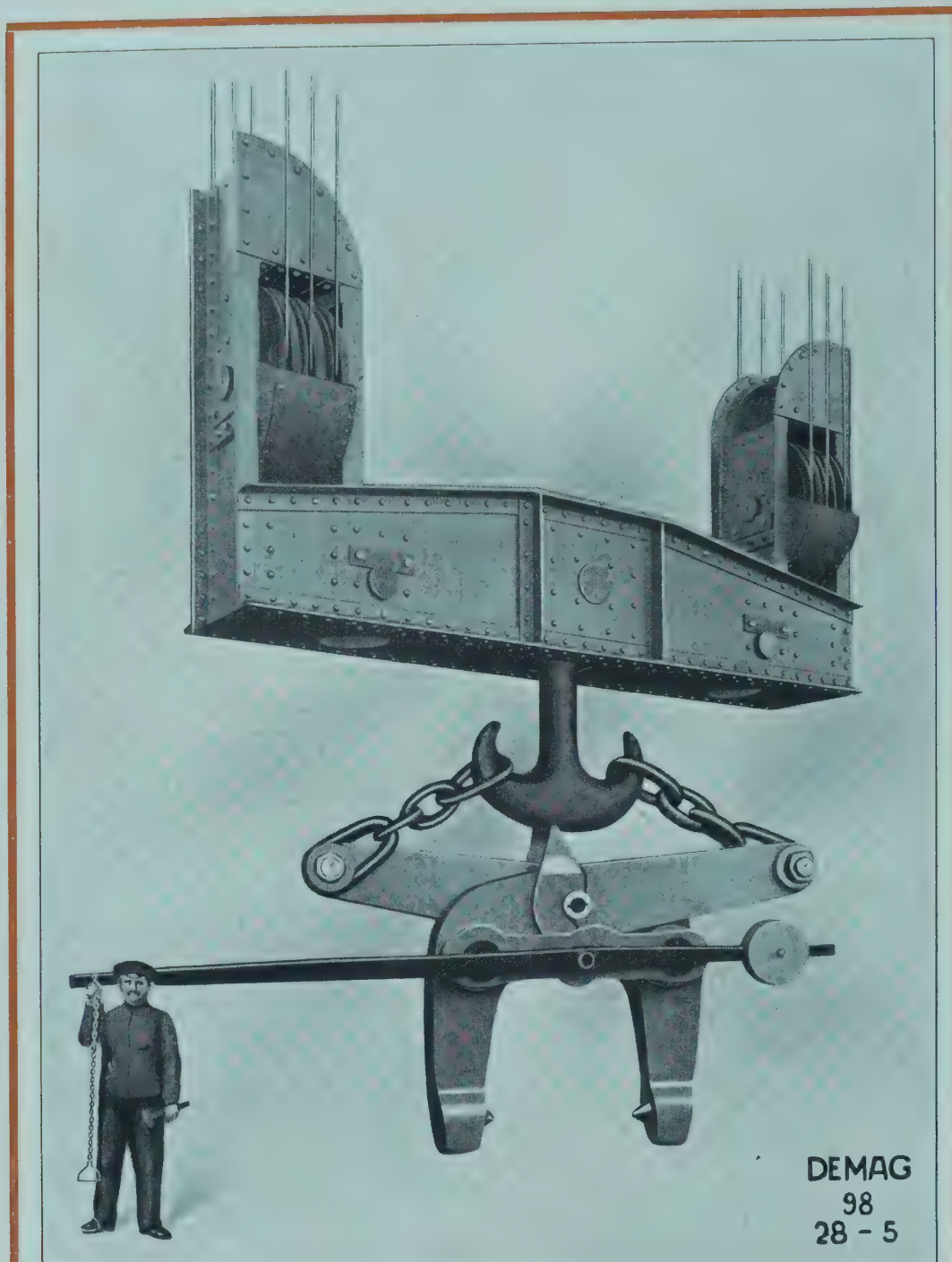




**W**hereas in the blooming and section rolling mills ingots of square cross-section are often used, in plate rolling mills so-called slabs are worked, these being better suited to the shape of the finished product. Plate rolling mills are divided into three groups according to the weight and dimensions of the slabs to be rolled and the thickness of the finished product, viz.:—armour plate rolling mills, ordinary plate rolling mills and sheet rolling mills. For the manufacture of armour plates cast slabs are rolled, whereas in the ordinary plate rolling mills and those for medium sheets slabs are rolled which have first been rolled down to a certain thickness and afterwards cut up. Heavy plate rolling mills with rolls more than 950 mm. in diameter and riffled sheet iron mills are almost exclusively constructed two-high, whilst for rolling mills with rolls less than 950 mm. in diameter the three-high system with oscillating tables capable of being raised and lowered is mostly preferred. After having been brought from the furnace to the rolls by means of a charging crane or carriage the slab is first passed several times lengthwise through the rolls, and when the length of the plate thus cogged is approximately equal to the desired width of the finished plate it is turned round by electric, hydraulic or often by hand turning devices, and rolled in the length till the plate acquires the desired thickness. In making riffled sheet iron the plate is finally passed through a two-high housings in which the one roll has been notched to suit the riffling required. On leaving the rolling mill the plate passes to the straightening machine, where any undulations in it are removed. In modern rolling mills the straightened plate is taken to the electric or hydraulic turning gear to be examined from all sides before going to the shearing machine to be cut to definite lengths. From the turning gear the plate is conveyed to the dividing shears to be cut to definite lengths, and then to the trimming shears, where it is cut to the desired width. Sometimes the plate has then to pass through a heating and straightening process, after which it is ready to leave the workshop.



For loading very heavy slabs the tongs illustrated below have been constructed, which are hung from the traverse of a casting crane with a lifting capacity of 80000 kilos, also delivered by us, the hooks for the casting ladles



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50 TON TONGS / DELIVERED FOR THE WITKOWITZER  
EISENWERKE, WITKOWITZ IN MÄHREN

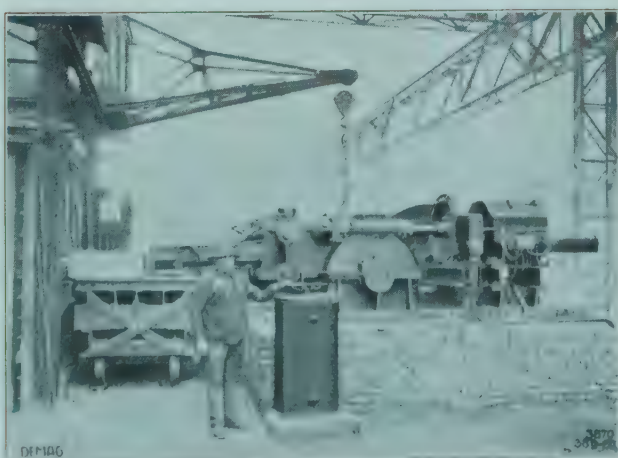
having first been removed. The tongs are kept open by pawls attached on both sides. To close the tongs these pawls are disengaged by a hand chain on the balanced lever, whereupon the arms of the tongs press against the slab with the points, gripping it automatically on being raised.





PUSHER / DELIVERED FOR THE GEISWEIDER EISENWERKE, A.-G., GEISWEID

The ingots and slabs are conveyed to the three twin Pushers, which we delivered, by means of special platform carriages. The illustration below shows the gear of the machine. The feed bars, which are fitted with interchangeable heads, are worked by a toothed rack and driver, the latter being driven from a 75 H.P. motor by a spur wheel and worm gear, which transmits to the feed bar a pushing force of 75 tons and a speed of 50 mm. per second.







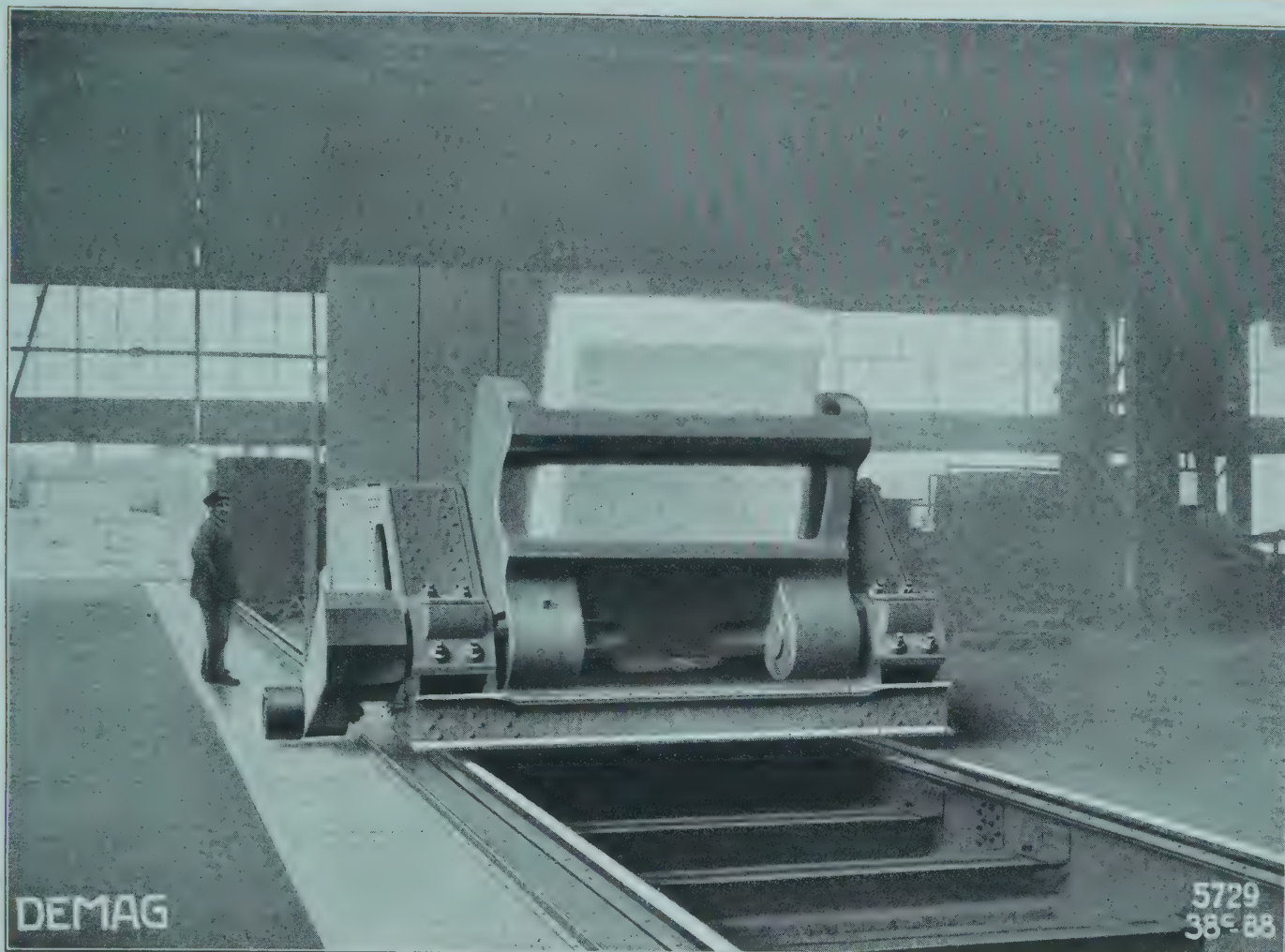
**SLAB TRANSPORTING CRANE TO CARRY 12000 KILOS  
DELIVERED FOR THE SHEET ROLLING MILL OF SCHULTZ-  
KNAUDT, AKTIEN-GESELLSCHAFT, ANGERORT nr. DUISBURG**



**Heavy  
slab tongs of a slab  
transporting crane  
to carry 10000 kilos.**

**Delivered  
to the Dillinger Hütten-  
werke Aktien-Gesell-  
schaft, Dillingen a. d. S.**



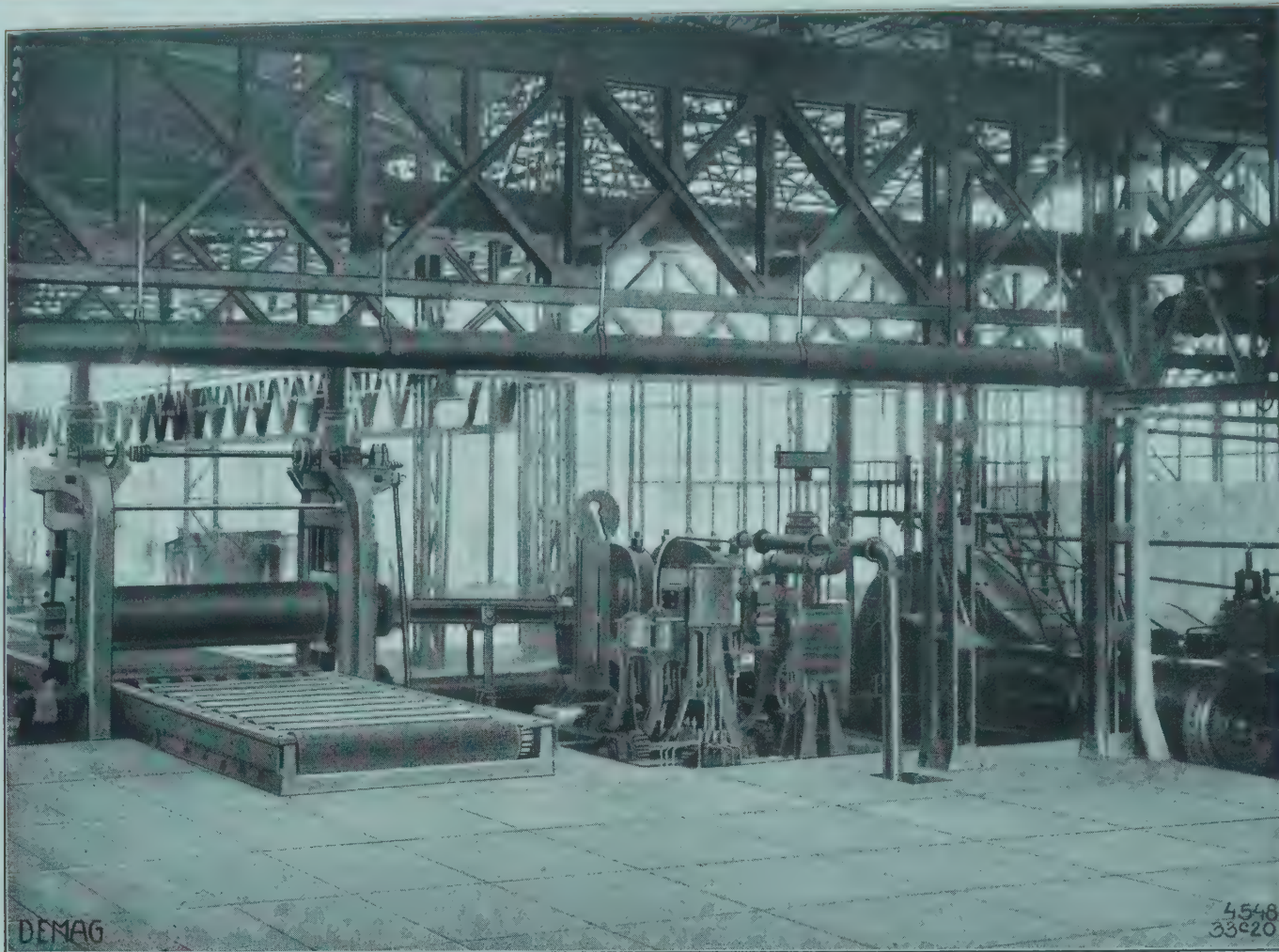


**TRAVELLING ELECTRIC SLAB TIPPER / DELIVERED FOR THE  
GELSENKIRCHENER BERGWERKS-AKTIEN-GESELLSCHAFT,  
DEPT.: AACHENER HÜTTENVEREIN, AACHEN-ROTHE-ERDE**

The tipper transports slabs up to a maximum weight of 30000 kilos from the soaking pit to the tipping place at the feed roller gear of the heavy two-high plate rolling mill about 90 metres away. The carriage has a high speed of horizontal motion in spite of the great weight of the slabs.



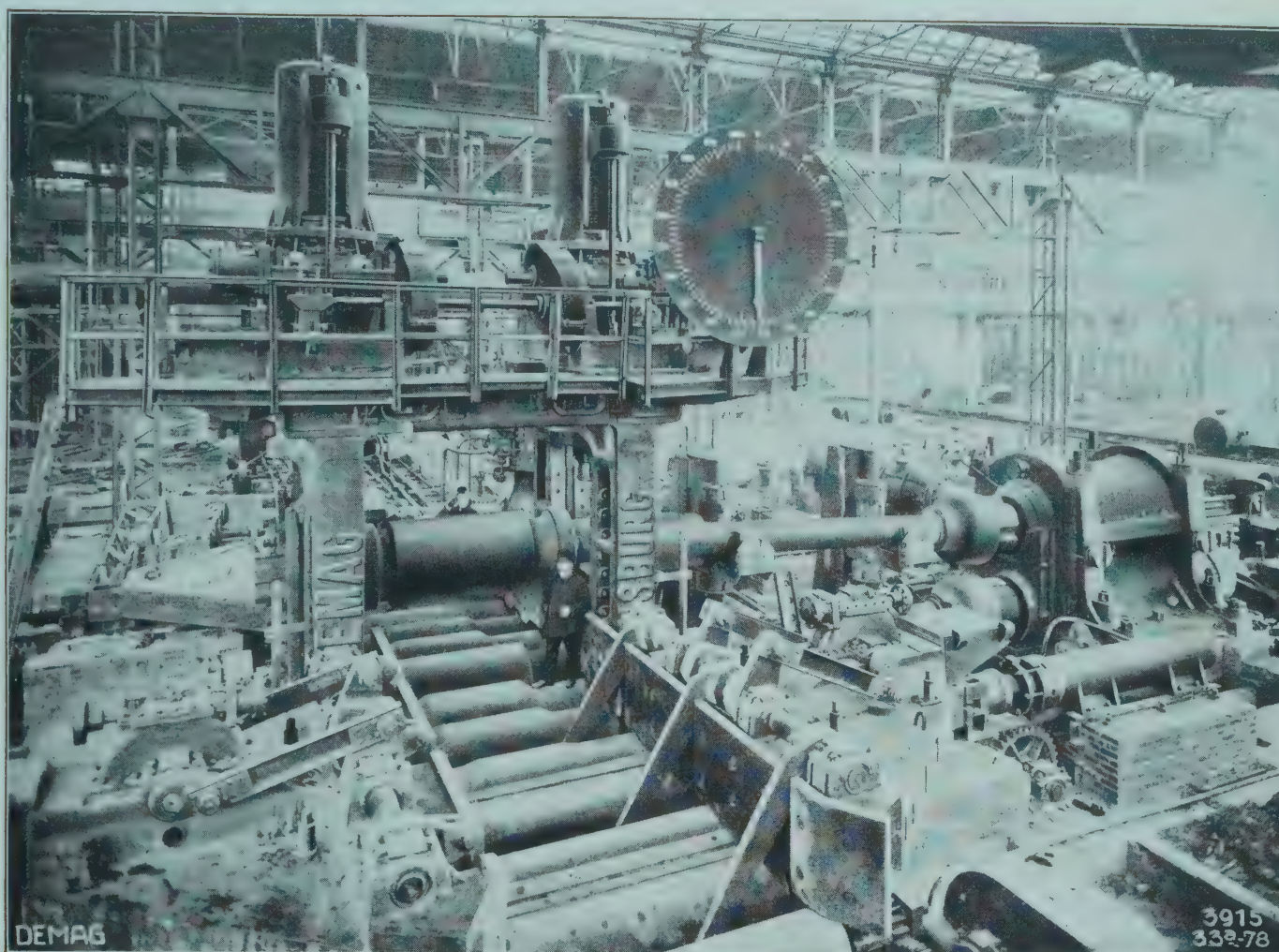




TWO-HIGH REVERS. MILL FOR HEAVY PLATES / DELIV. FOR THE GUTEHOFFNUNGSHÜTTE, AKTIENVEREIN FÜR BERGBAU UND HÜTTENBETRIEB, OBERHAUSEN, RHINEL.

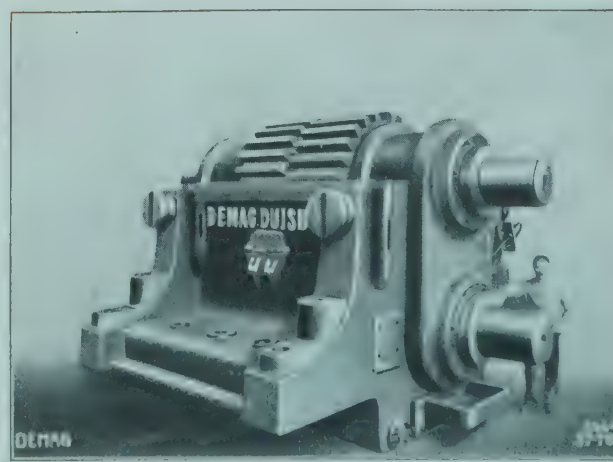
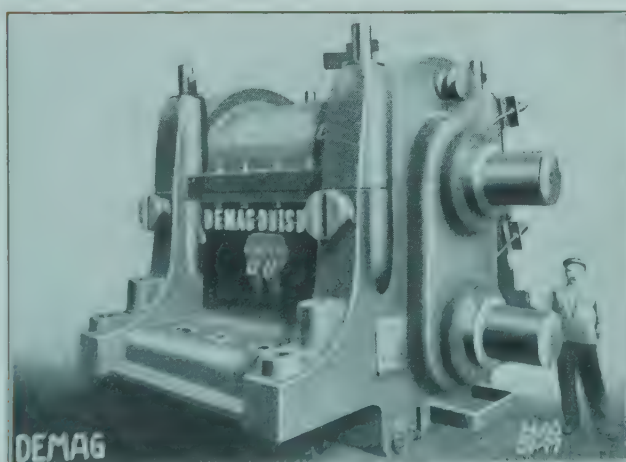
**T**he plate reversing mill illustrated above serves for making plates of the heaviest description. The rollers are 1100 mm. in diameter and their barrel-length is 4 metres. The largest opening is 800 mm. The pinions belonging to this plant are 1330 mm. in diameter. The mill is driven by a twin reversing engine, 1400 mm. diameter and 1400 mm. stroke, the mill being driven with a gear of 1 : 2.4.





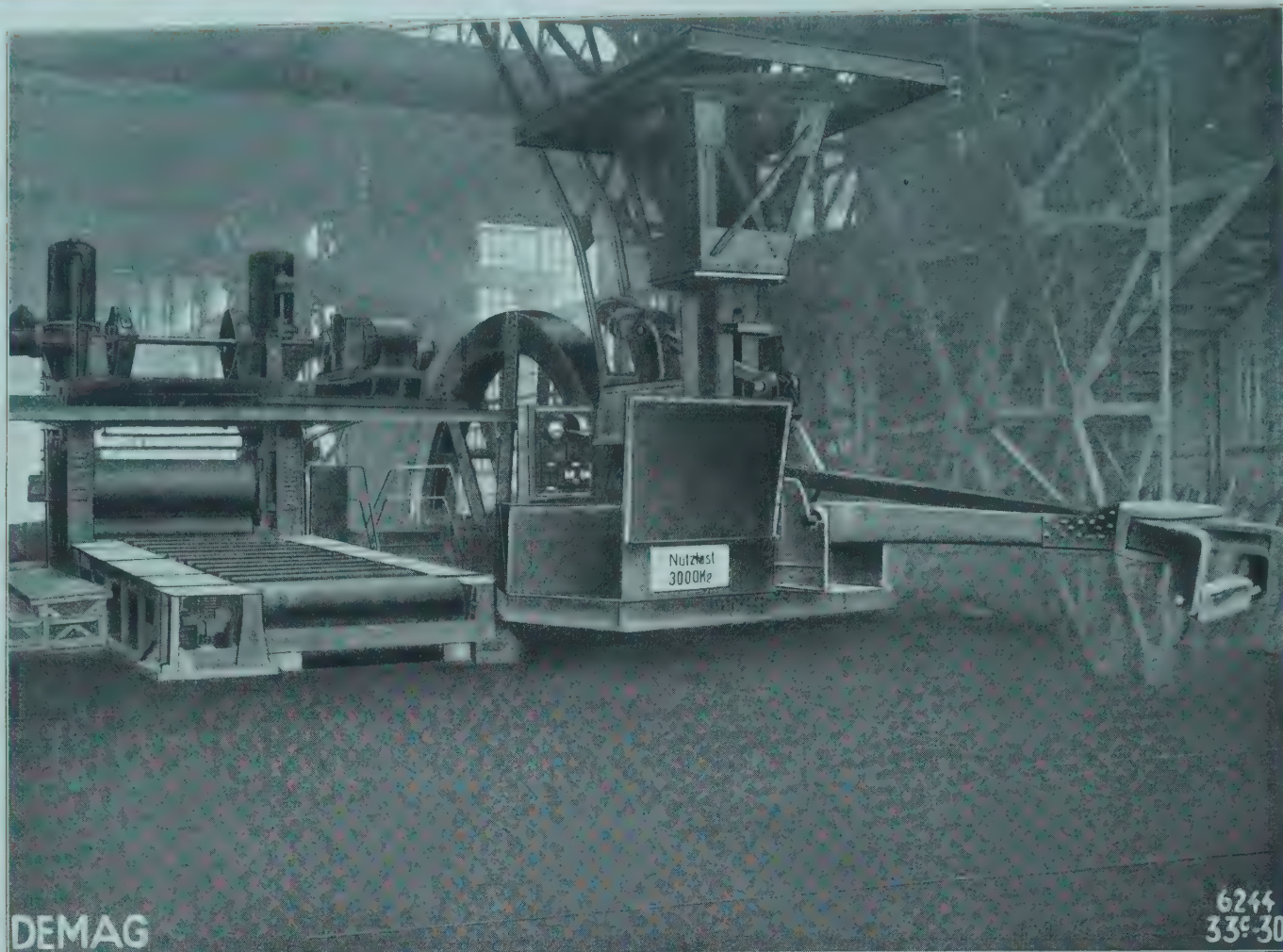
1030 mm. SLAB MILL IN COURSE OF ERECTION / DELIV. FOR THE GELSENKIRCHENER BERGWERKS-AKT.-GES., DEPT.: AACHENER HÜTTENVEREIN, AACHEN-ROTHE-ERDE

**B**efore and behind the mill are hydraulic manipulators and in front of the mill train there is also an electric bloom filter and an electric slab raising device. The top roll can be lifted 1 metre to enable the slabs up to a weight of 12 tons to be up-set edgeways in grooves cut into the rolls at the sides. The adjustment and counterbalancing of the top roll is effected by electricity by our patent system.



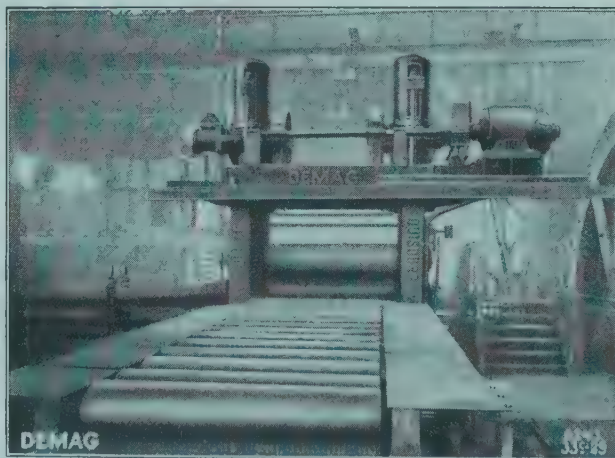
Spindle housings for the above rolling mill, with wrought steel pinions 1400 mm. in diameter, the teeth being 1600 mm. long. The total length of a pinion is 5050 mm.





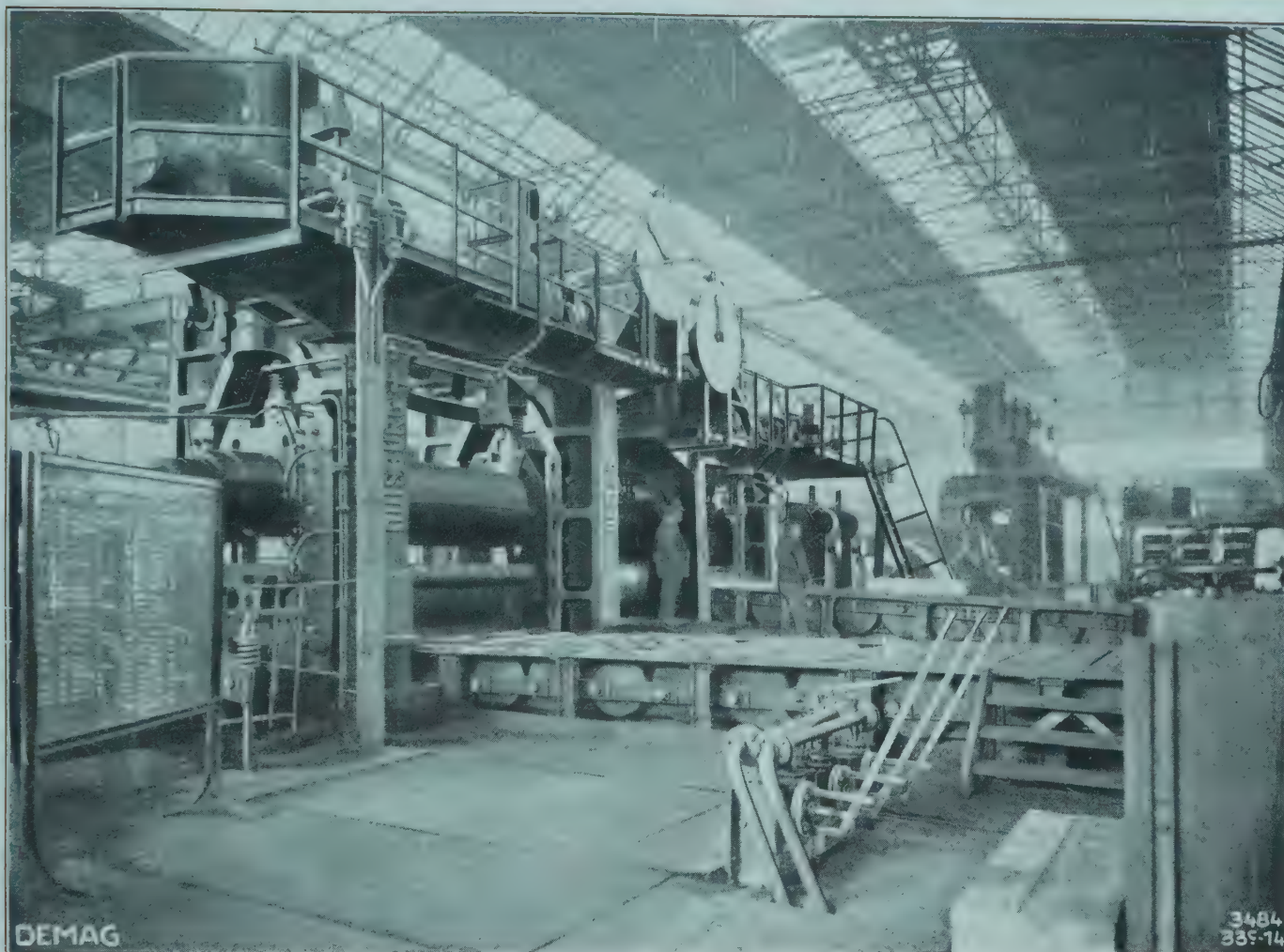
THREE-HIGH PLATE ROLLING MILL / DELIVERED TO THE HASPER EISEN- UND STAHLWERK, AKT.-GES., HASPE IN WESTPHALIA

**P**late rolling mill consisting of the 750 mm. three-high mill visible in the foreground, with a barrel length of 2300 mm., and a 700 mm. three-high mill, not shown in the above illustration, with a barrel length of 1900 mm. The first housings, in which heavy plate are made, is served by an oscillating table with power-driven rolls, whereas the rolls of the lifting table of the second housings are not driven. The electric adjustment is the Demag patent which serves at the same time to counterbalance the top roll, an arrangement which has stood the test



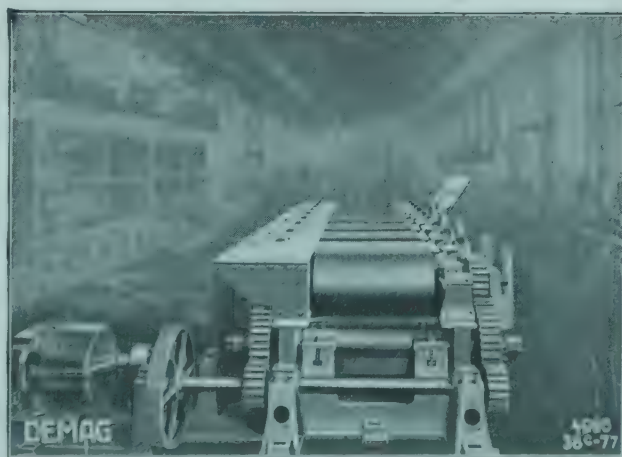
well. The middle roll is moved automatically on the Demag system, from the lifting table. The lack of all special control increases the performance and affords safe working.





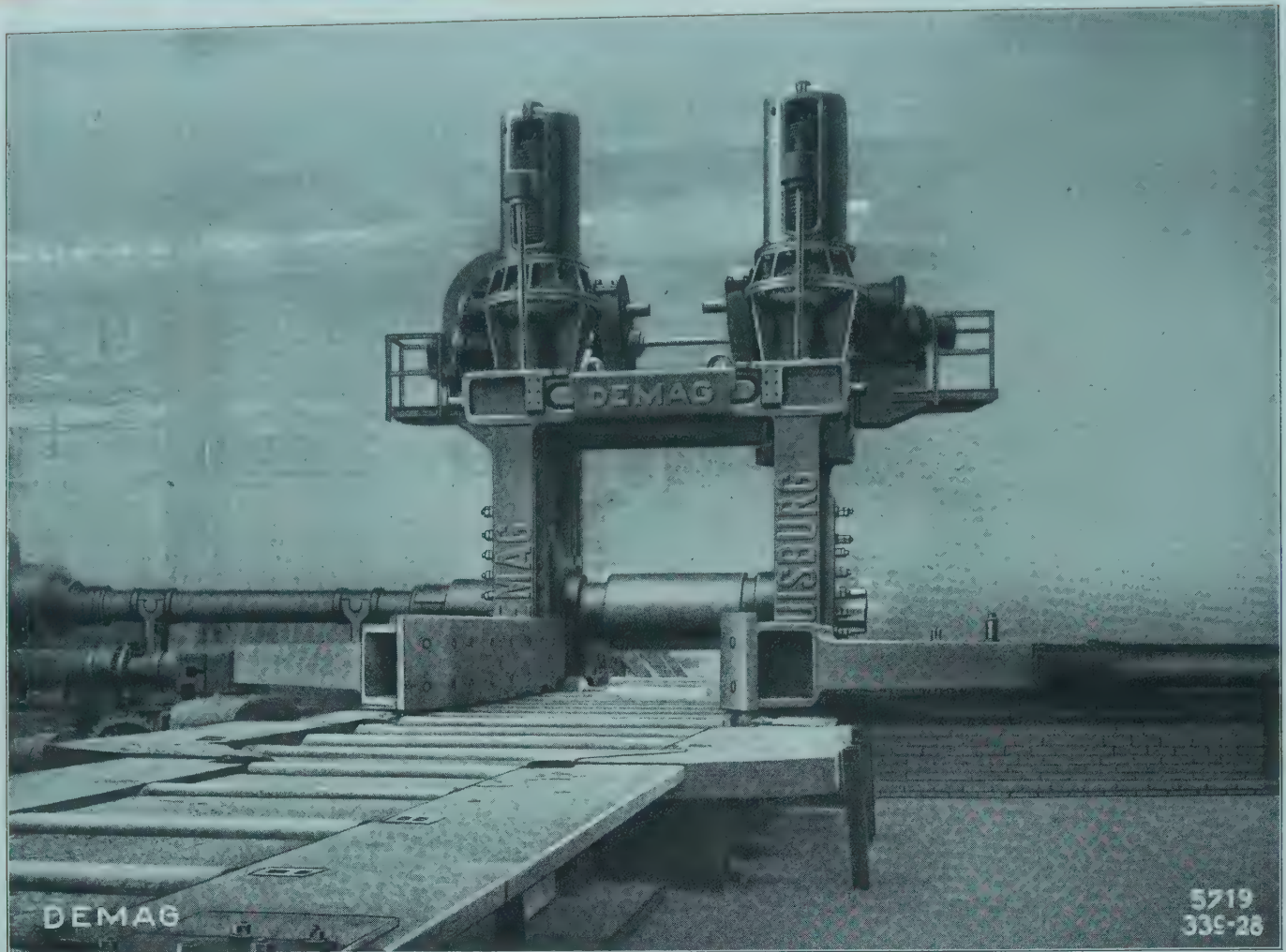
GELSENKIRCHENER BERGWERKS-AKTIENGESELLSCHAFT  
DEPT.: AACHENER HÜTTENVEREIN, AACHEN-ROTHE-ERDE

**P**late rolling mill plant consisting of the three-high mill seen in the foreground, with rolls 950 mm. in diameter and 3000 mm. barrel-length and the 750 mm. three-high mill the rolls of which have a barrel-length of 2200 mm. In the background is to be seen the 1250 mm. two-high mill with a barrel-length of 4500 mm., on which slabs up to a maximum weight of 30000 kilos are rolled. The top rolls of all the housings are fitted with "Demag" patent electric adjustment and counter-balance, whereas in the three-high housings the middle roll is raised and lowered by hydraulic

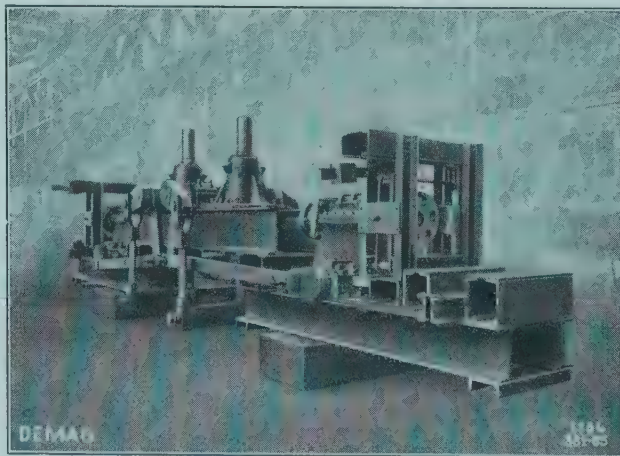


power. The lower illustration shows an oscillating table for the above plant, erected in the workshop. The table is raised and lowered by an electric lifting device. The rolls of the table are also worked by electricity.





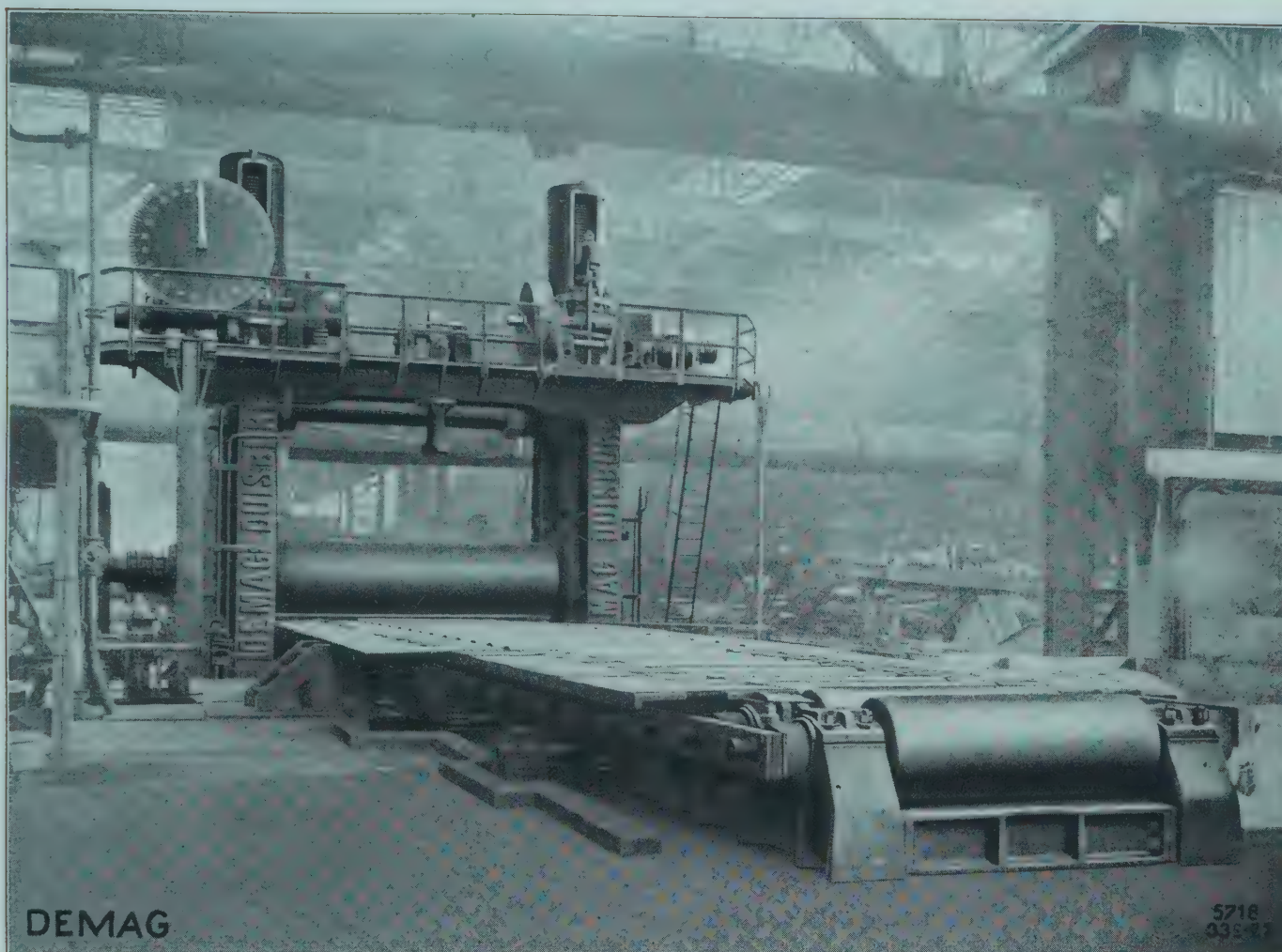
1030 mm. REVERSING SLAB MILL / DELIVERED FOR THE  
GELSENKIRCHENER BERGWERKS-AKTIEN-GESELLSCHAFT,  
DEPT.: AACHENER HÜTTENVEREIN, AACHEN-ROTHE-ERDE



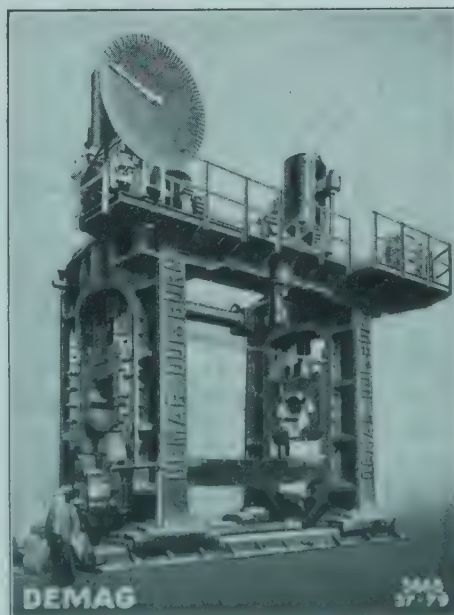
Electric Plate turning device to be  
built into the roller

gear. Delivered for  
the Poutil. Works  
in St. Petersburg.





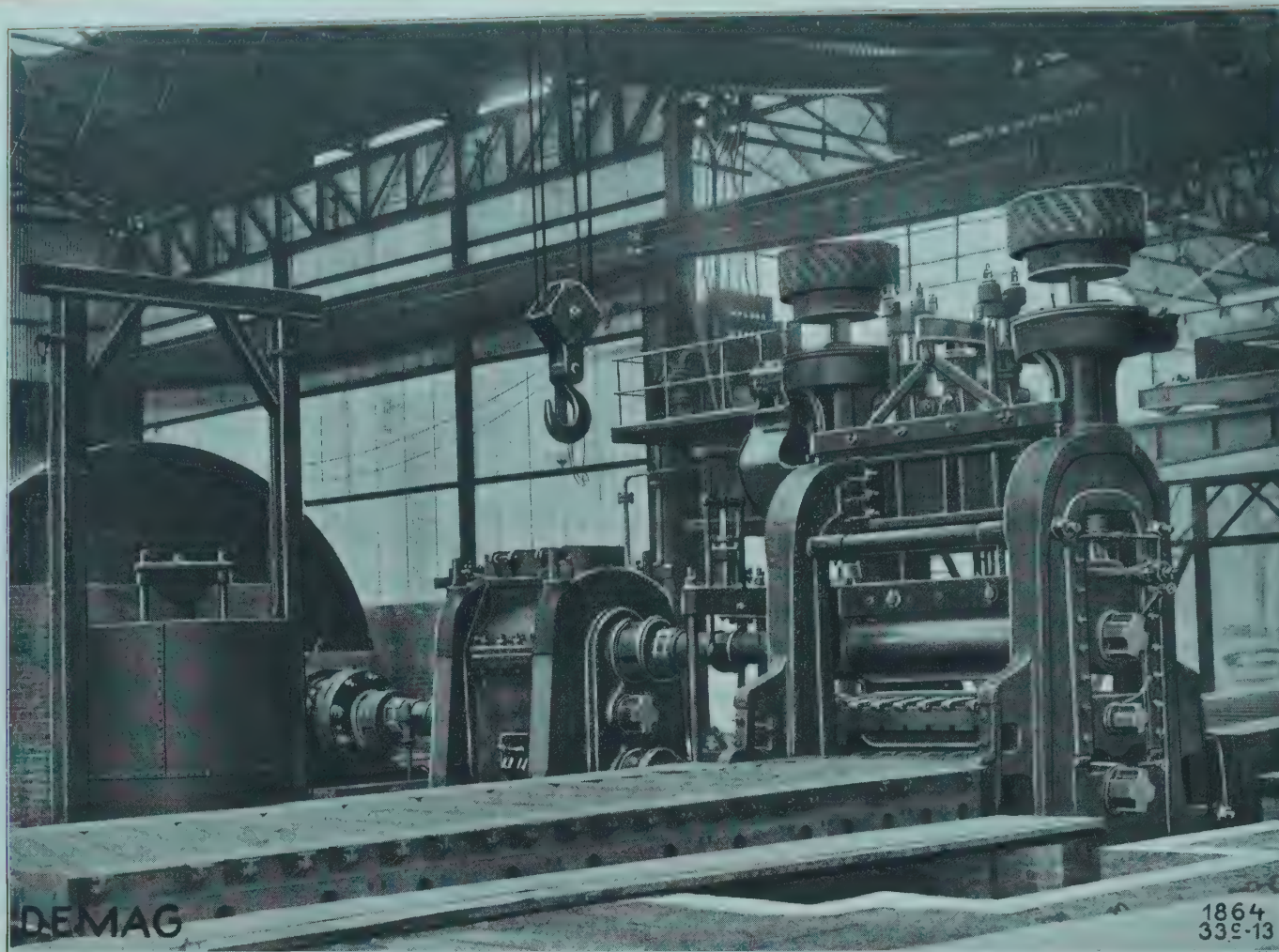
1250 mm. TWO-HIGH PLATE REVERSING MILL, BARREL-LENGTH 4500 mm. / DELIV. FOR THE GELSENKIRCHENER BERGWERKS-A.-G., DEPT.: AACHENER HÜTTENVEREIN, AACHEN-ROTHE-ERDE



1250 mm. two-high plate mill housings for the above mill erected in the workshop

"Demag" patent electric adjustment and counterbalancing of the top roll.

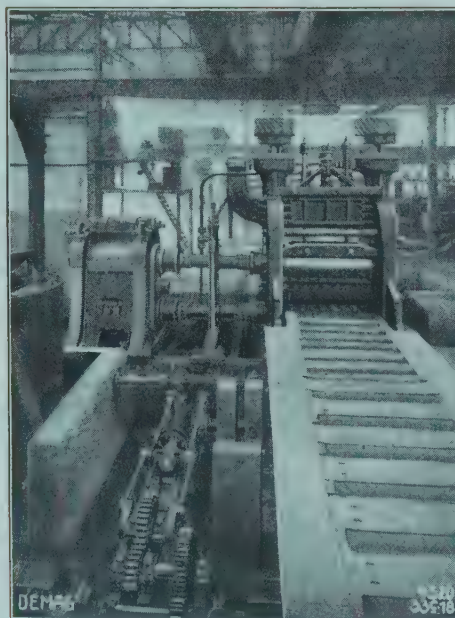




750 mm. THREE-HIGH PLATE MILL / DELIVERED FOR WILLIAM BEARDMORE LTD., GLASGOW

The adjustment of the top roll is electric. The counterbalancing of the top roll and the raising and lowering of the middle roll are effected by hydraulic power.

Electric lifting device for the lifting tables with hydraulic



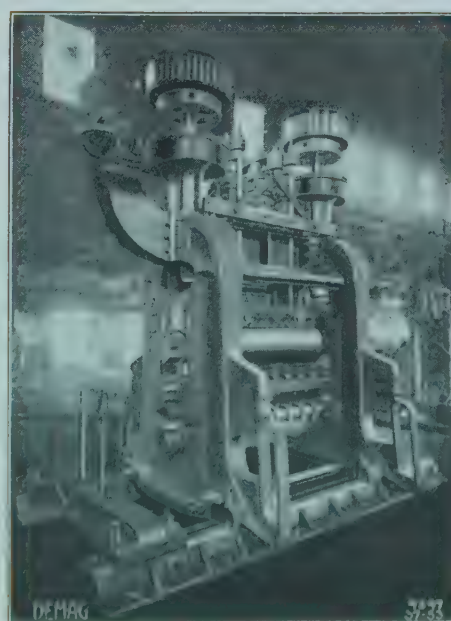
counterbalancing device for the above mill.





750 mm. THREE-HIGH PLATE ROLLING MILL / DELIV. FOR THE  
EISENHÜTTE HOLSTEIN AKTIEN-GESELLSCHAFT, RENDSBURG

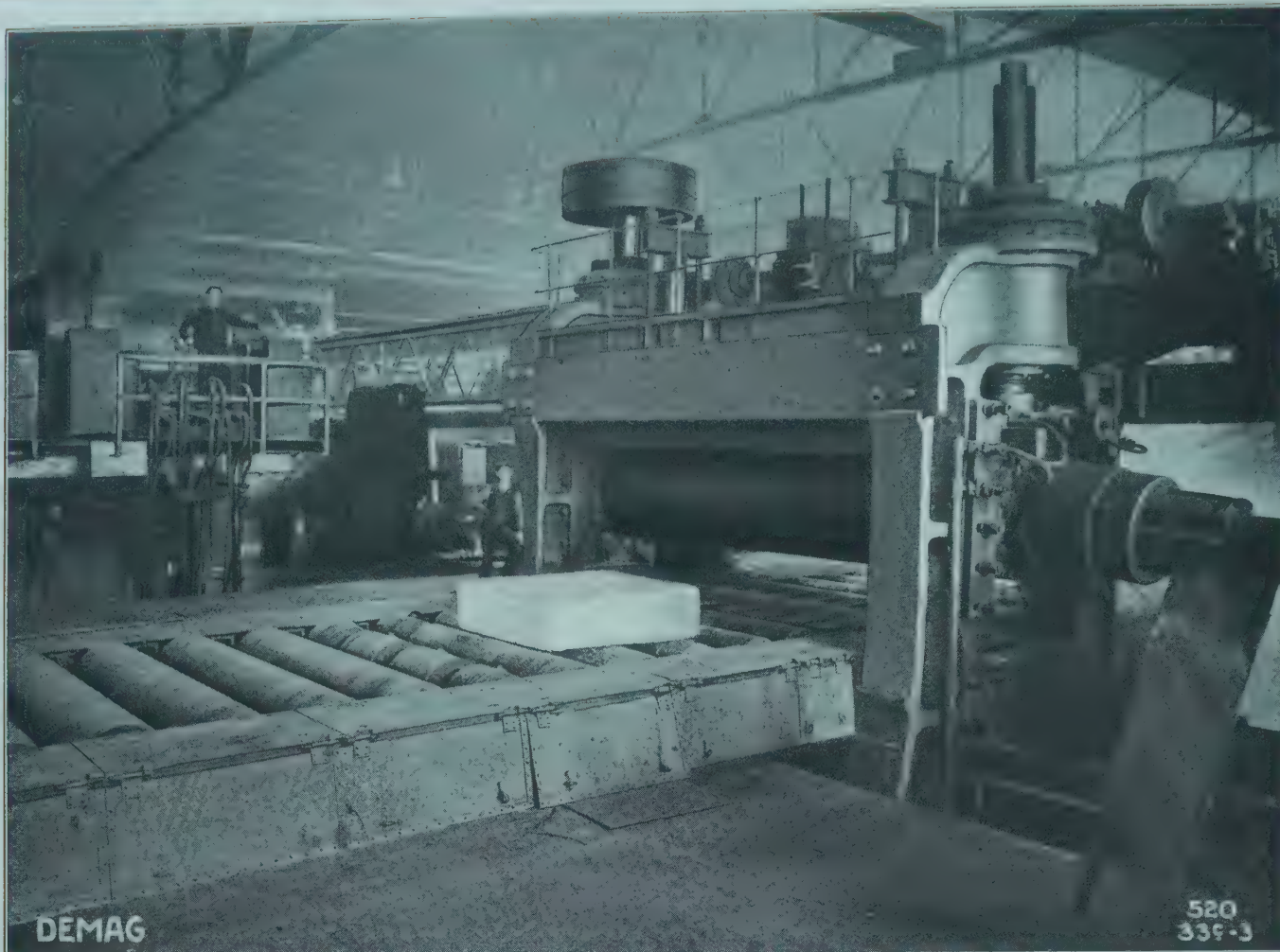
The adjustment of the top roll is electric. The counterbalancing of the top roll and the raising and lowering of the middle roll are effected by hydraulic power.



750 mm. three-high  
plate mill housings  
(From a photograph  
taken in the work-

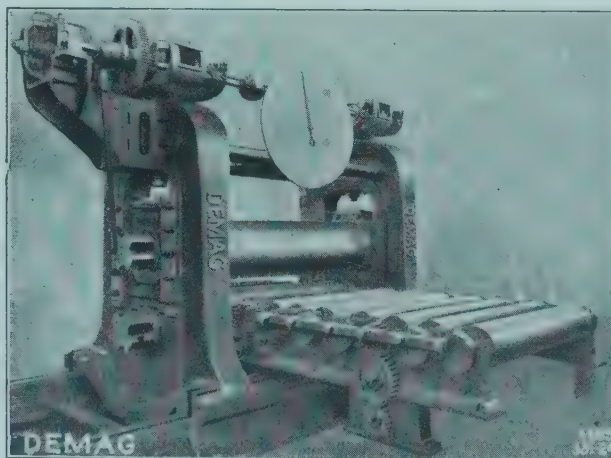
shop) / Delivered  
for William Beard-  
more Ltd., Glasgow  
..... (England). .....





HEAVY TWO-HIGH PLATE ROLLING MILL / DELIV. FOR BISMARCK-HÜTTE, AKTIEN-GESELLSCHAFT, BISMARCKHÜTTE (UPPER SILES.)

Two-high plate-mill housings for copper sheets, with roller gears, for a French plate rolling mill

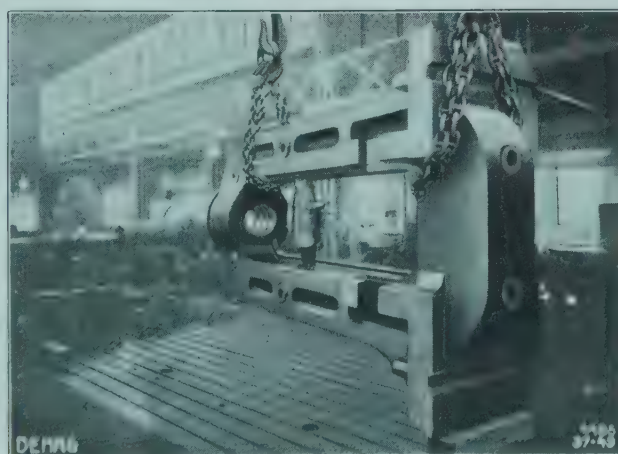




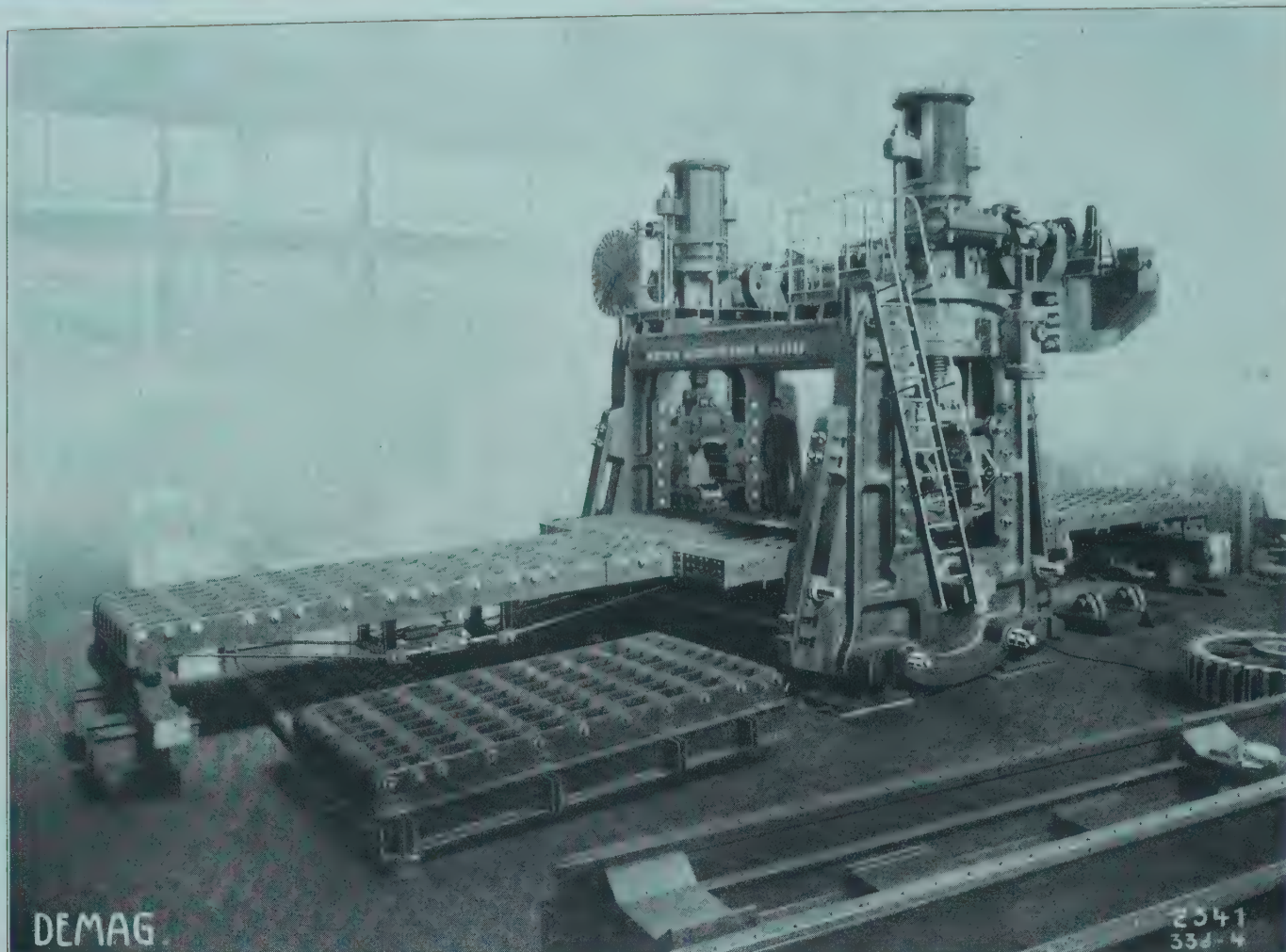


TRANSPORTING A HOUSINGS WEIGHING 75000 KILOS  
DELIVERED FOR AN ARMOUR PLATE ROLLING MILL

A housings for an armour plate rolling mill, weight 75000 kilos. From  
a photograph taken in the workshop.

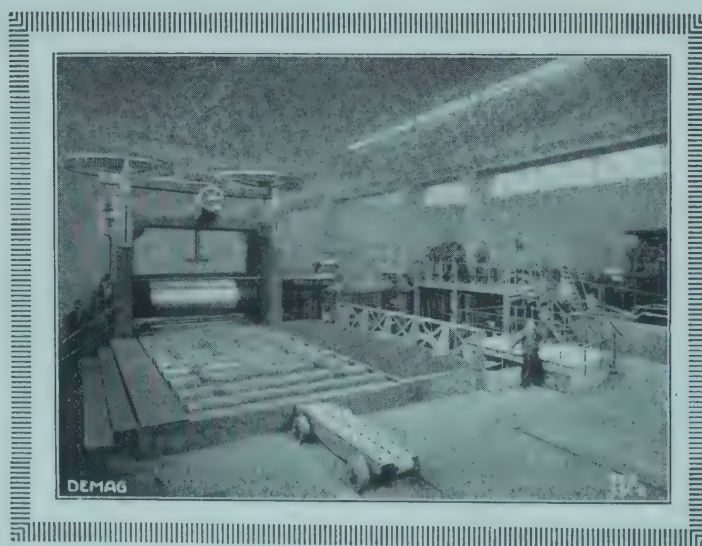




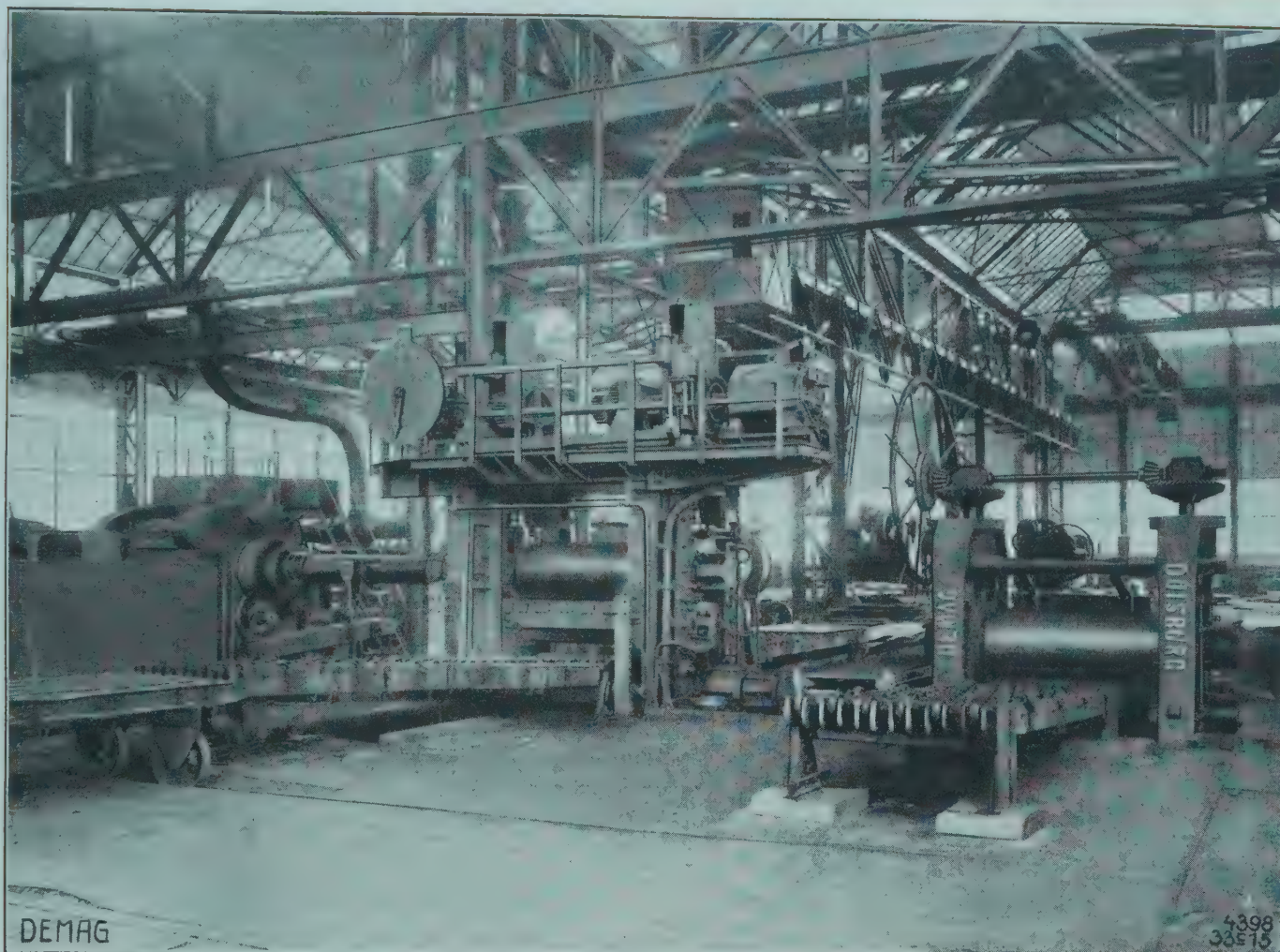


920 mm. TWO-HIGH COPPER SHEET ROLL. MILL HOUS. / SOC. DE L'USINE  
À CUIVRE ET À TUBES CI-DEVANT E. ROSENKRANTZ, ST. PETERSBURG

Armour plate rolling mill delivered for the Compagnie des Forges et Aciéries  
de la Marine de Homécourt, St. Chamond.







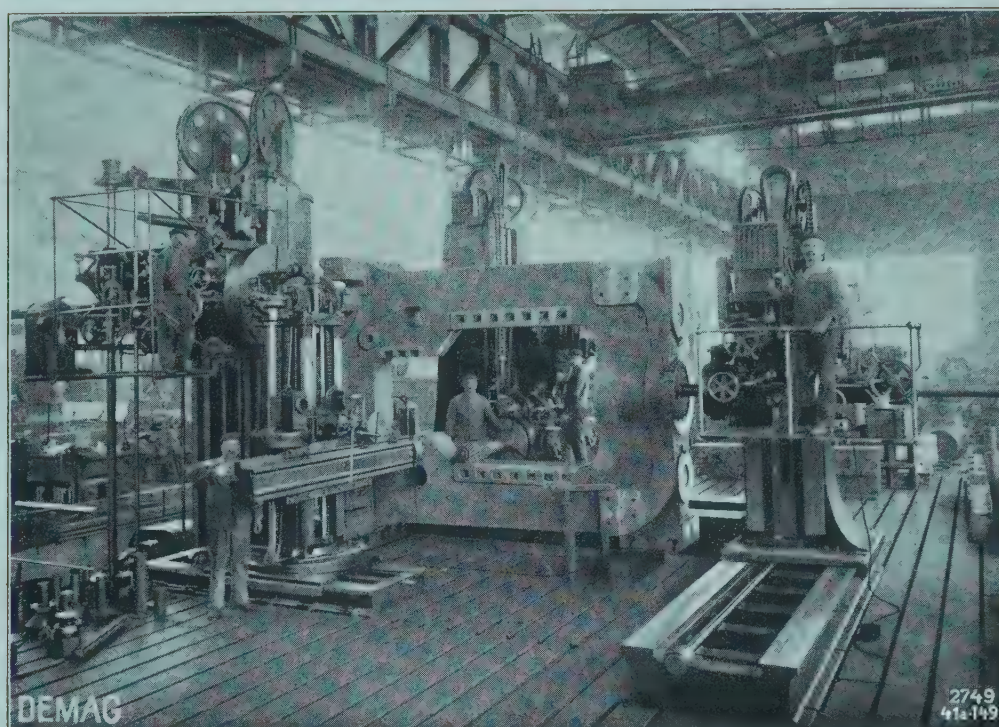
750 mm. THREE-HIGH PLATE ROLLING MILL AND 700 mm. TWO-HIGH PLATE ROLLING MILL WITH OSCILLATING TABLES

950 mm. three-high plate mill for rolls with a barrel-length of 3250 mm. "Demag" patent adjustment and counterbalancing of the top roll.





# WORKING AT A HOUSINGS IN OUR WORKSHOP



## WITH SEVERAL MACHINES AT THE SAME TIME



# THE FINISHING SHOP IN THE PLATE ROLLING MILL

**W**hen the plate has been rolled and is still warm it is conveyed to the straightening machine, where any undulations are removed. After passing through the straightening machine it goes on to the hot bank and from there it is very often taken to a turning device where it is examined at the back as to its condition. From here it passes on to the shearing machines. In order to be able to convey the plates rapidly from the dividing shears to the trimming shears without a crane many rolling mills have iron plates laid on the floor level in which bars are fixed, the ends of which bear rolls that are attached excentric and move very easily. The surface of these rolls lies at about the same height as the lower blade of the shearing machine, so that it is not necessary to raise the plate to cut it, but merely to shift the plate by hand along the surface of the rolls, which can be done very easily and without any great expenditure of strength, as the rolls revolve. In many workshops these roller gears – called swan-necks – are also erected on the platform of the plate weighing machine, so that the plate can be taken from the shearing machine to the weighing machine without a crane, and from there back to the loading place. It is then advantageous to have a magnet crane with which to lift the finished plates and to convey them to the plate stores, where they are piled up and are then ready to be taken or sent away. Before thin plates leave the works it is as well to cold straighten them. For this purpose several plates are laid one upon another and passed through the straightening machine. Many plates such as boiler plates, also have to be annealed in the reheating furnace and afterwards straightened in order to remove any stress in the material.



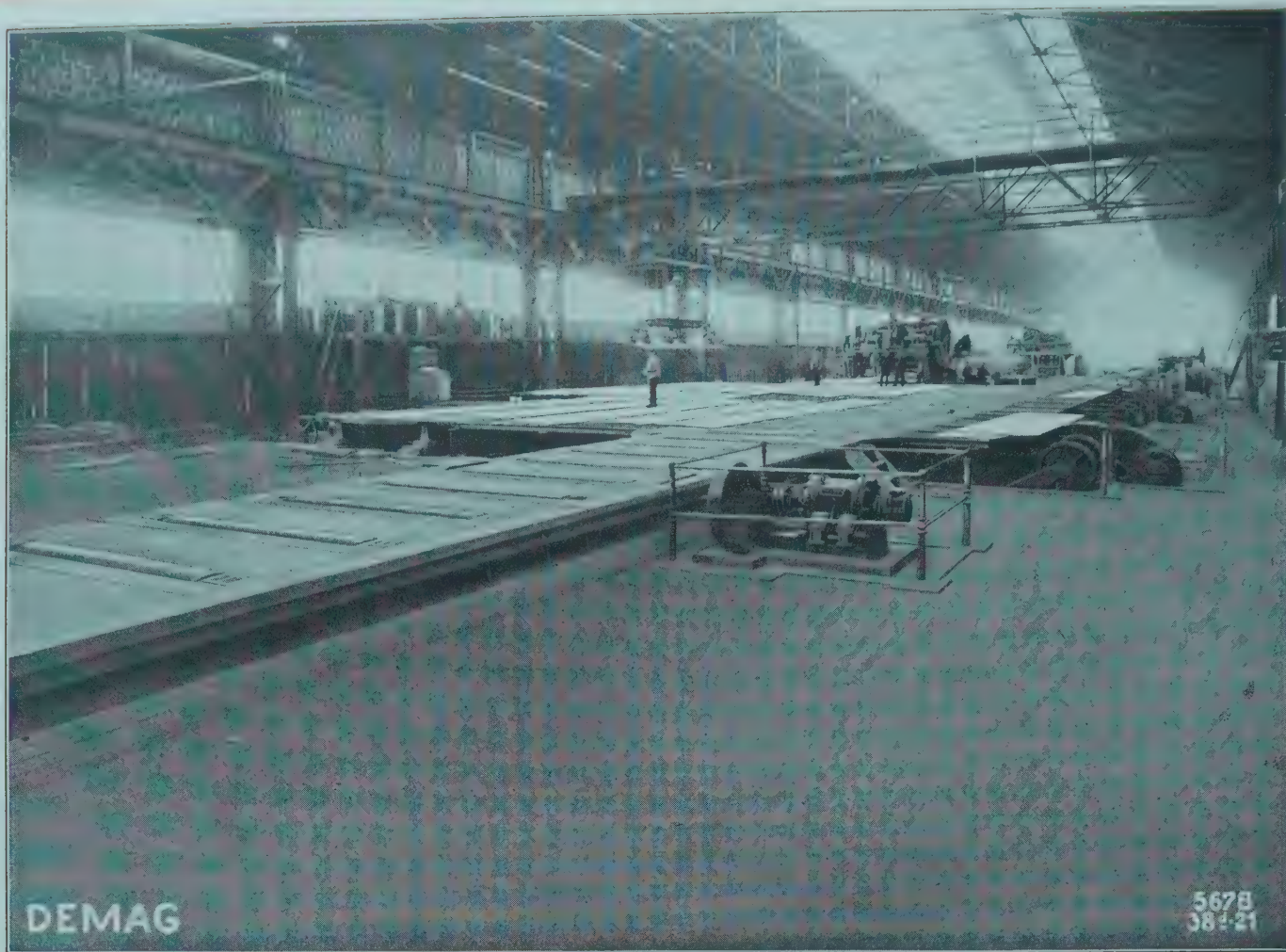
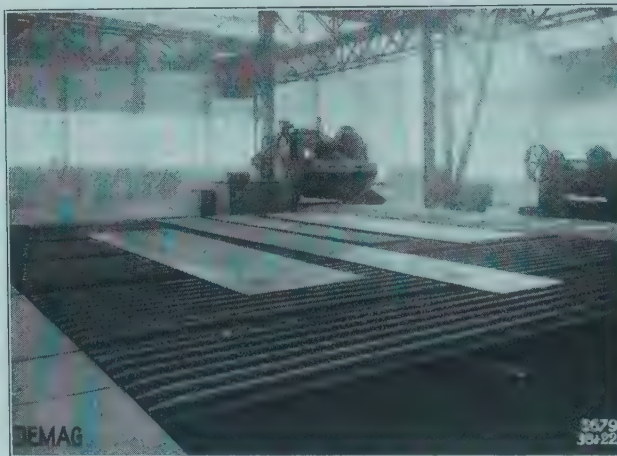
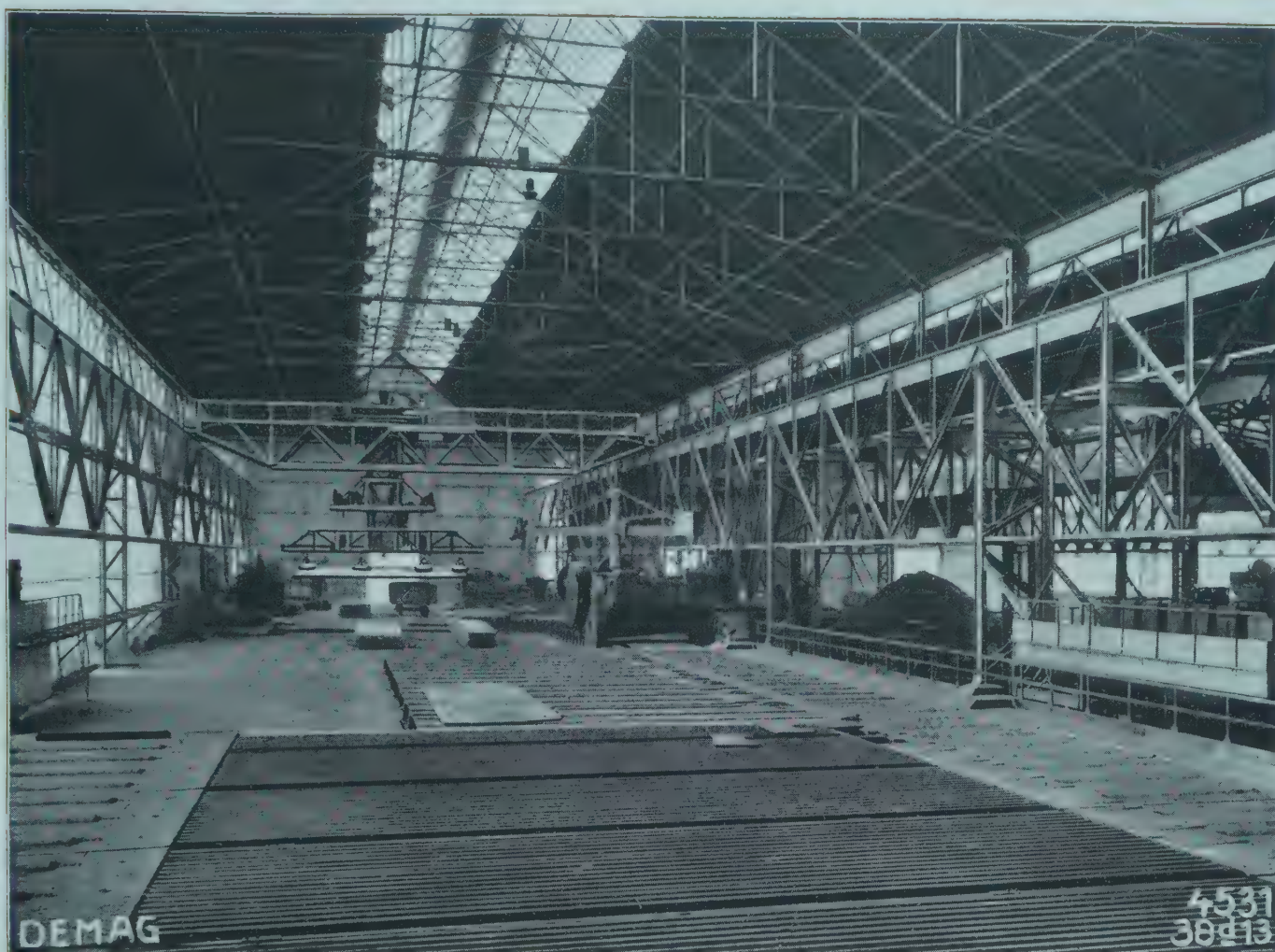


PLATE HOT BANKS WITH ELECTRIC SKID PLANT / DELIVERED FOR  
THE GELSENKIRCHENER BERGWERKS-AKTIEN-GESELLSCHAFT,  
DEPARTMENT: AACHENER HÜTTENVEREIN, AACHEN-ROTHE-ERDE

Plate hot bank / Deliv. for the Aktiengesellschaft Bremerhütte in Weidenau, Sieg.  
The plate rolling mill for this plant was also delivered by us.





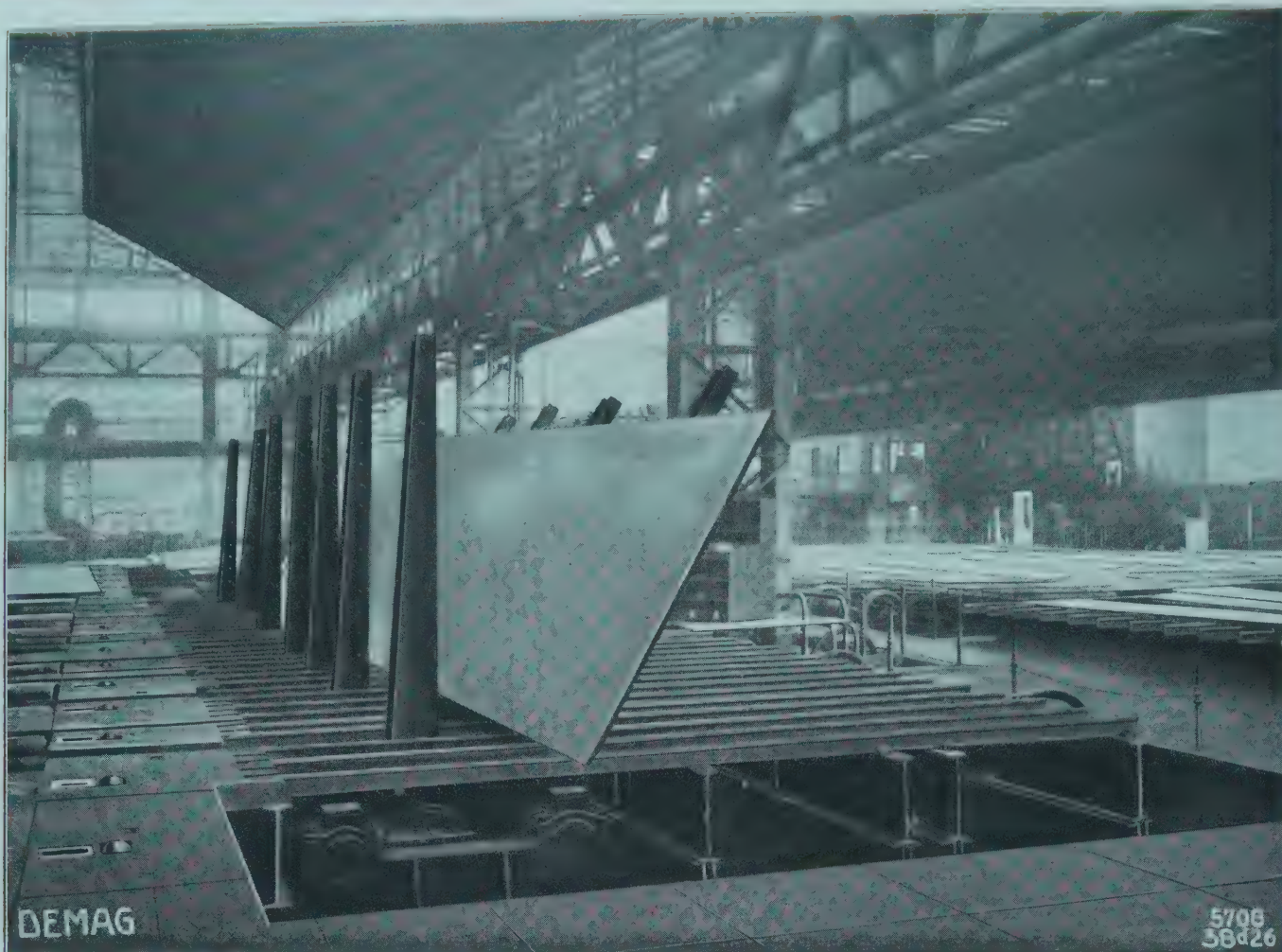


HOT BANK FOR AN 1100 mm. TWO-HIGH PLATE ROLLING MILL / DELIVERED FOR A LARGE METALLURGICAL WORKS. THE MAGNET CRANE VISIBLE IN THE BACKGROUND, FOR TRANSPORTING THE PLATES, WAS ALSO DELIVERED BY US.

Hot bank with hydraulic plate turning device for the 1250 mm. two-high plate rolling mill of the Aachener Hüttenverein, Aachen-Rothe-Erde.



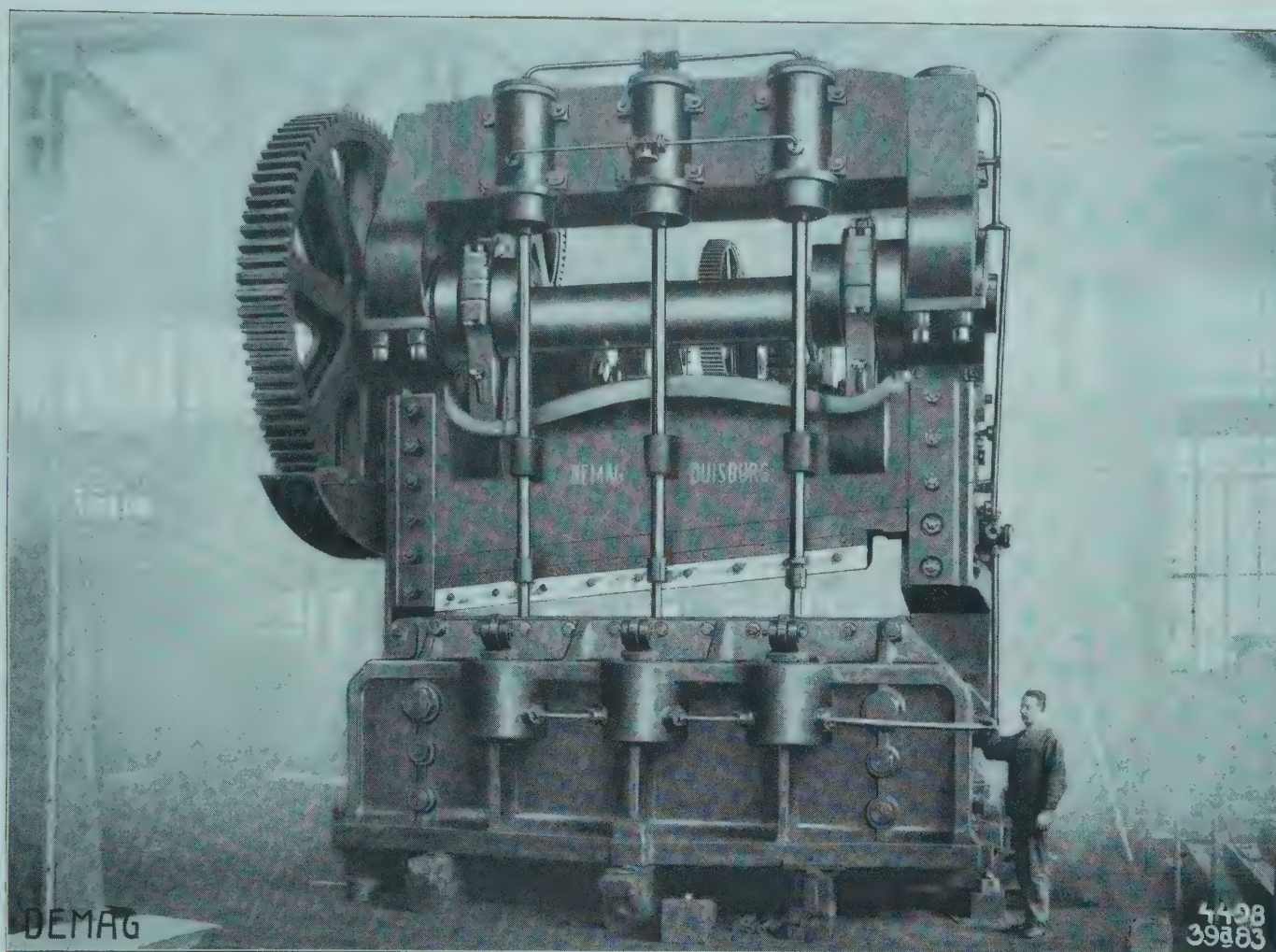




HOT BANK FOR THE 1250 mm. PLATE ROLLING MILL / DELIVERED FOR THE GELSENKIRCHENER BERGWERKS-AKTIENGESELLSCHAFT, DEPARTMENT: AACHENER HÜTTENVEREIN, AACHEN-ROTHE-ERDE

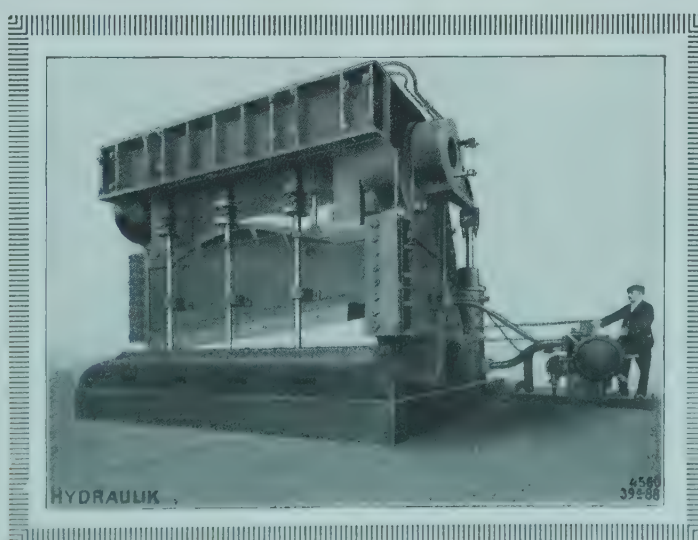
**I**n the foreground of the above illustration is to be seen a hydraulic plate turning device in which the plate is just being turned. This device is capable of turning plates up to 4.5 metres in width, to enable them to be examined at the back as to the accuracy of the surface. It is not until after this process that the plate is marked and cut up on the shearing machine erected behind the turning device. By this means faulty plates are prevented from undergoing any further process. The process of turning is as follows: The plate that has been brought up from the hot bank is raised by a group of levers into an almost vertical position. In this position the plate is held firm, by lips on the levers, till the levers of the second group nearly touch the plate. Both groups of levers are then moved forward till the plate is slightly inclined in the other direction, i. e., till one set of levers has passed the plate to the other set. The latter set then brings the plate into a horizontal position.



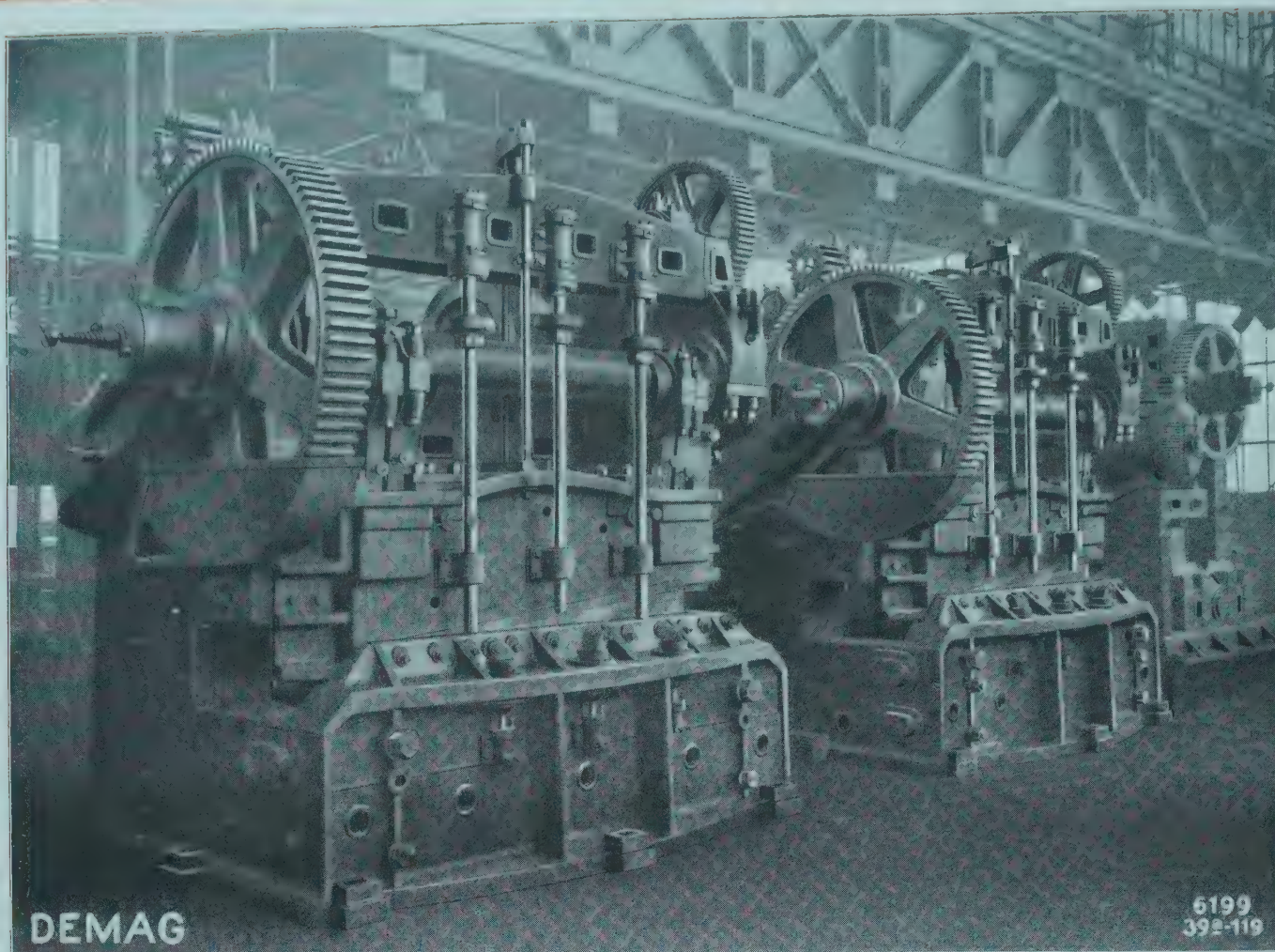


DOUBLE FRAME PLATE SHEAR. MACHINE DRIVEN WITHOUT A FLY-WHEEL BY TWO REVERS. ENGINES, COMPR. AIR FOR HOLD. DOWN THE PLATES AND THREE TRANSP. ROLLS IN THE SUPPORT OF THE BOTTOM BLADE

Heavy hydraulic plate shearing machine with pressure staging device for cutting the plates, fitted also with cross blades for cutting the waste strips from the trimming process. / Delivered for the Rheinische Stahlwerke A.-G., Duisburg.



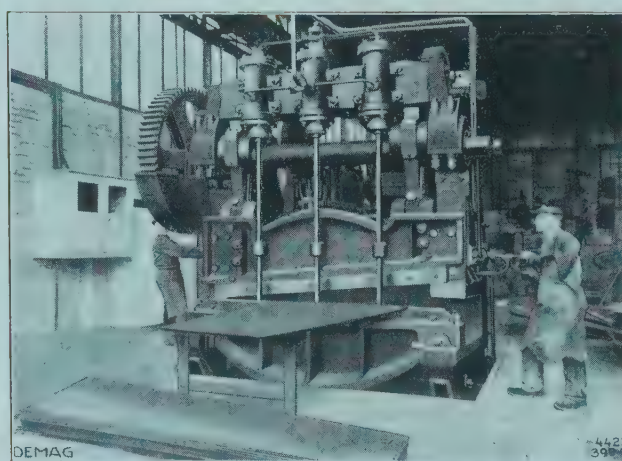




## ELECTRIC PLATE SHEARING MACHINES / RHEINISCHE STAHLWERKE, AKTIEN-GESELLSCHAFT, DUISBURG

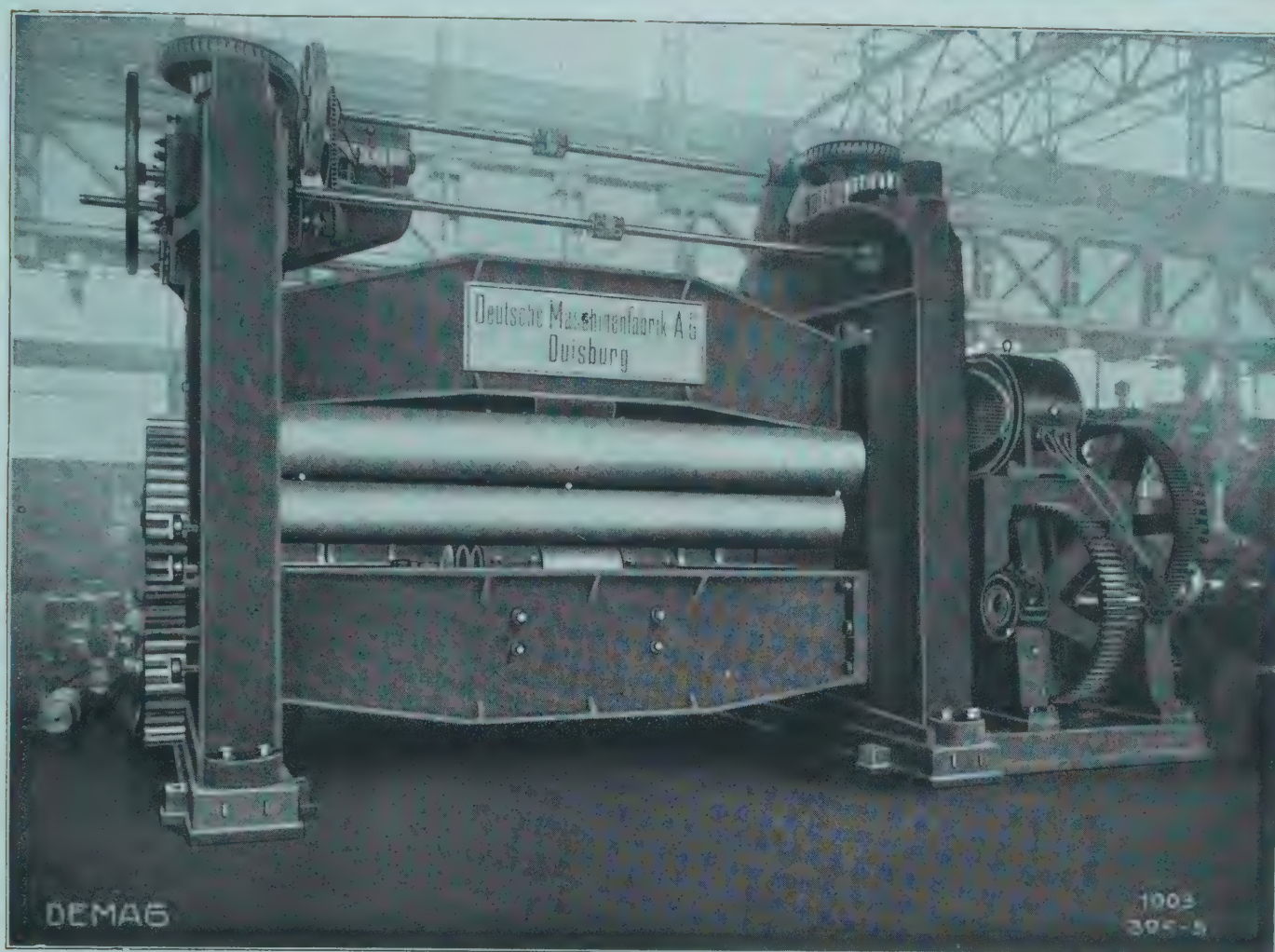
**T**he above illustration shows two double frame plate shearing machines for plates of 2700 mm. width and 30 mm. thickness, made on the Demag patent system, with cross blades built into them, and capable of being lifted to two different heights, one for cutting strips and the other for cutting and trimming plates and at the same time cutting the waste strips.

Double frame plate shearing machine, 2000 × 20 mm.,



driven by a reversing motor without a fly-wheel.

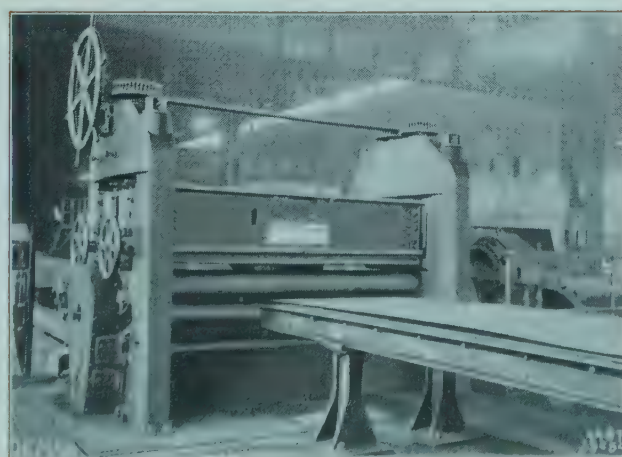




ELECTRIC PLATE STRAIGHTENING MACHINE / DELIVERED FOR HEIN, LEHMANN & CO., AKTIEN-GESELLSCHAFT, DÜSSELDORF

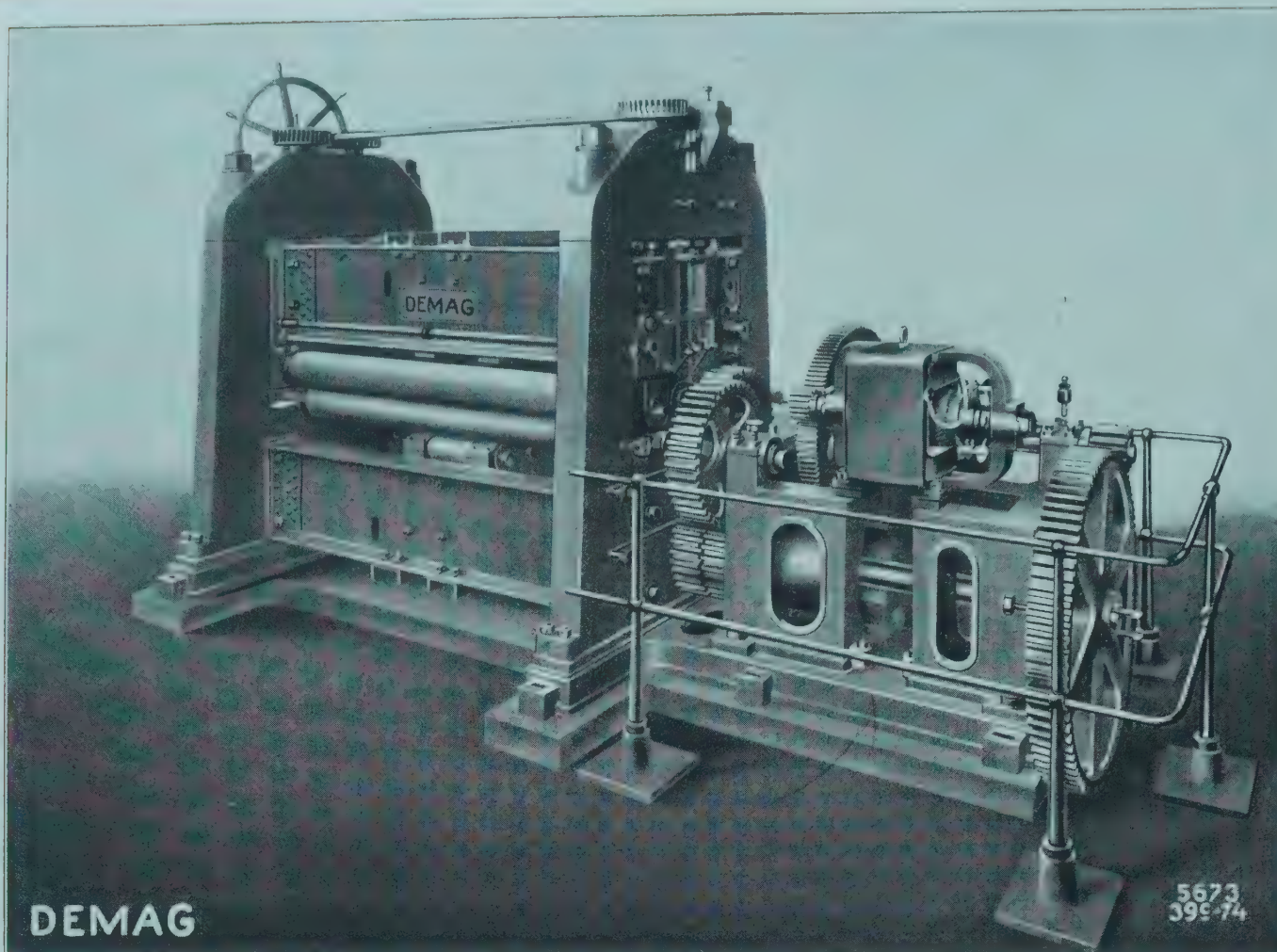
**T**he above illustration shows a plate straightening machine delivered by us to Messrs Hein, Lehmann & Co., Ltd. in Düsseldorf. It is for plates up to  $3500 \times 30$  mm., the top rolls being adjusted by a special motor and hand-wheels. The machine has five supported straightening rolls, and a guide roll before and behind the two top rolls.

Electric plate  
straightening  
machine



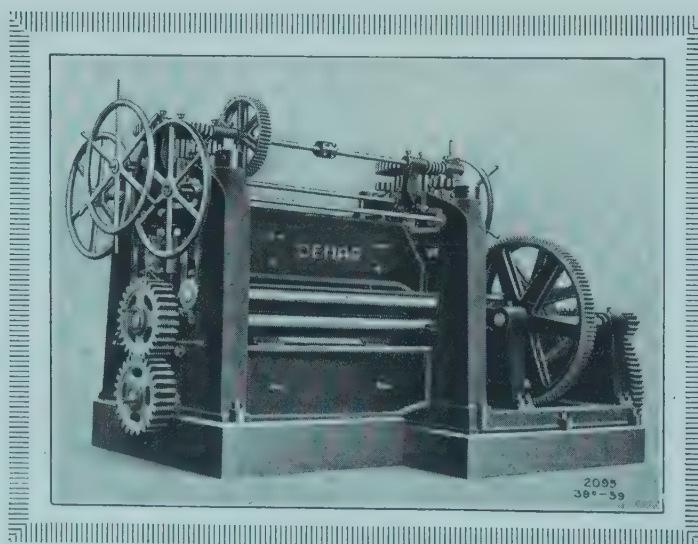
Salgo Tarjánér  
Eisenwerks-A.-G.,  
Rimamurany (Hung.)



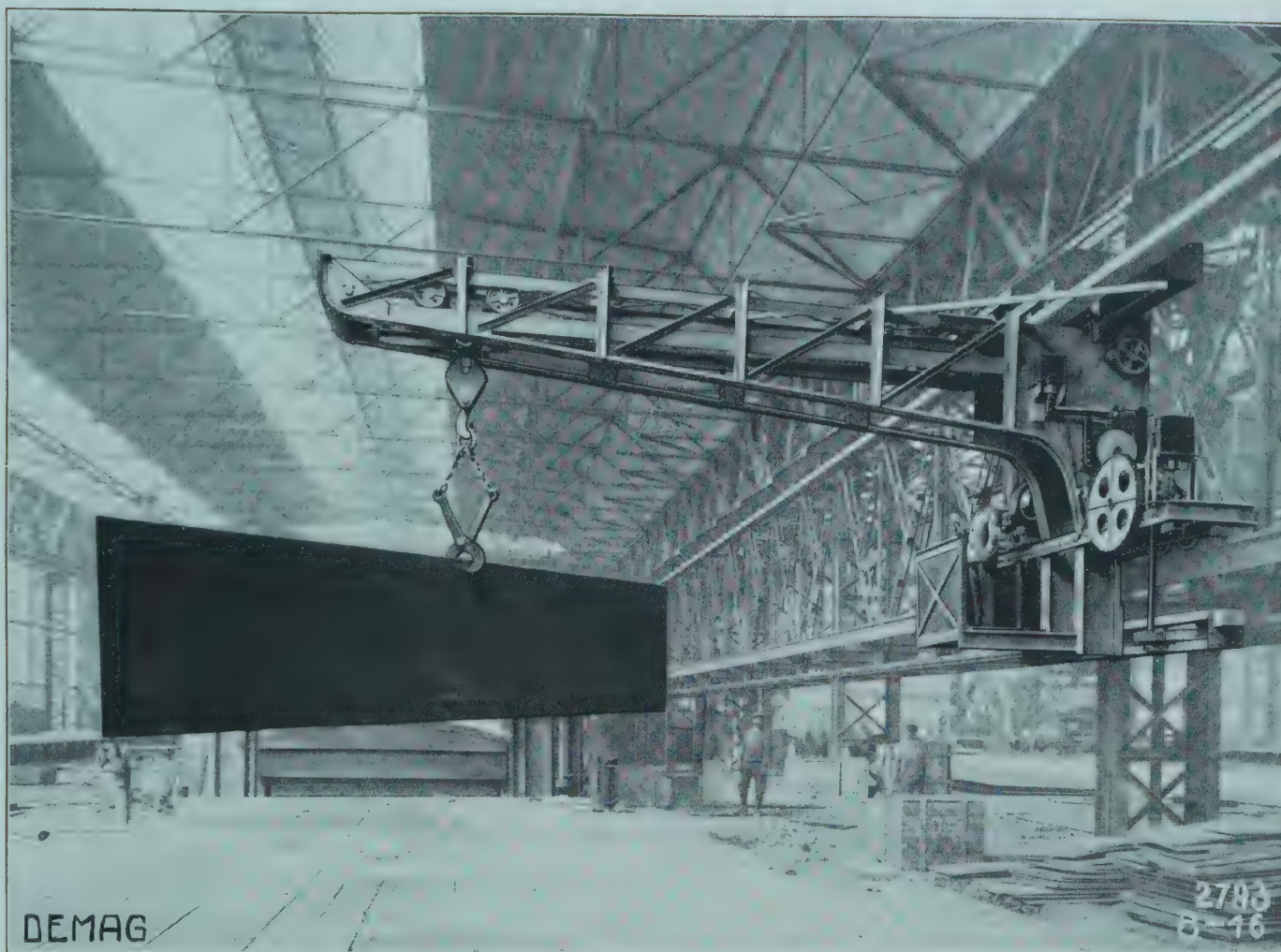


**ELECTRIC PLATE STRAIGHTENING MACHINE FOR PLATES UP TO 15 mm. THICK / DELIVERED FOR THE SALGO TARJÁNER EISENWERKS-AKTIENGESELLSCHAFT RIMAMURANY (HUNGARY)**

Electric plate straightening machine for plates of  $2000 \times 20$  mm. / Delivered for the Aktiengesellschaft für Verzinkerei und Eisenkonstruktion vormals Jakob Hilgers, Rheinbrohl.

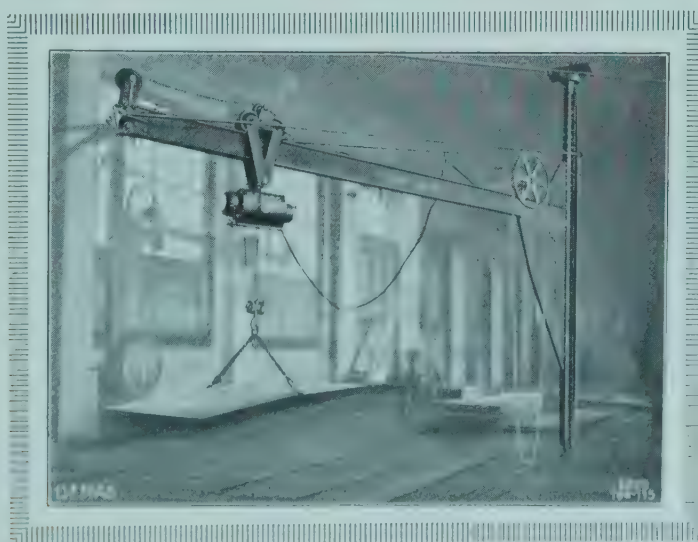






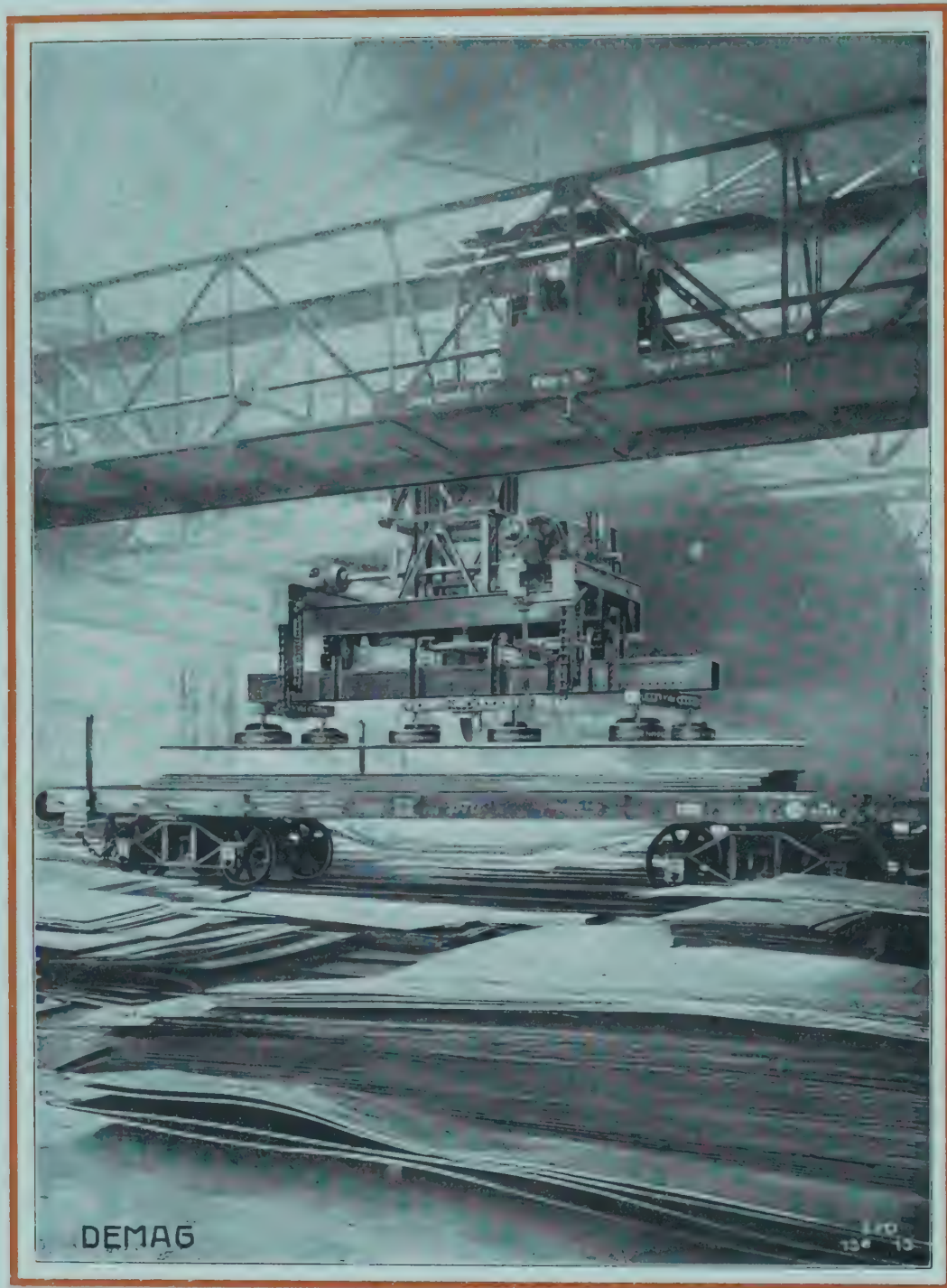
**ELECTRIC BRACKET CRANE FOR TRANSPORTING PLATES  
DELIVERED FOR THE PLATE ROLLING MILL OF SCHULZ-KNAUDT,  
AKTIENGESELLSCHAFT, ANGERORT nr. DUISBURG**

**"Demag Patent" electro-pulley block transporting plates / Delivered  
to the shipyard of Ewald Berninghaus, Duisburg.  
The cheapest electric lifting appliance.**





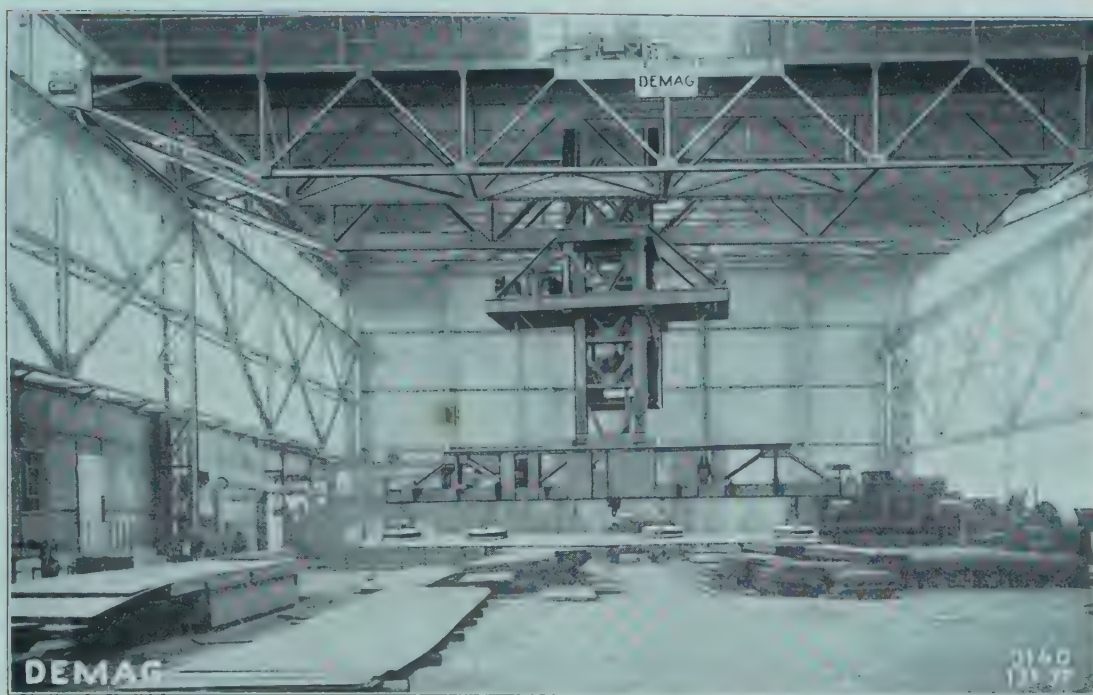
# LOADING PLATES WITH



DEMAG LIFTING MAGNETS  
LARGE NUMBERS MADE



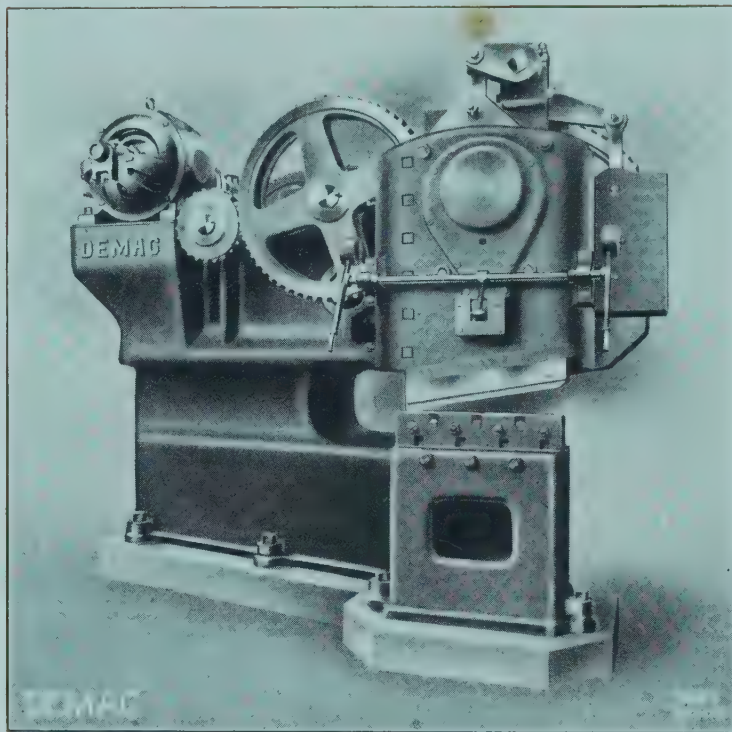
## MAGNET CRANES FOR PLATES



DEMAG LIFTING MAGNETS  
A GREAT SAVING OF TIME



# ELECTRIC PLATE SHEARING MACHINE



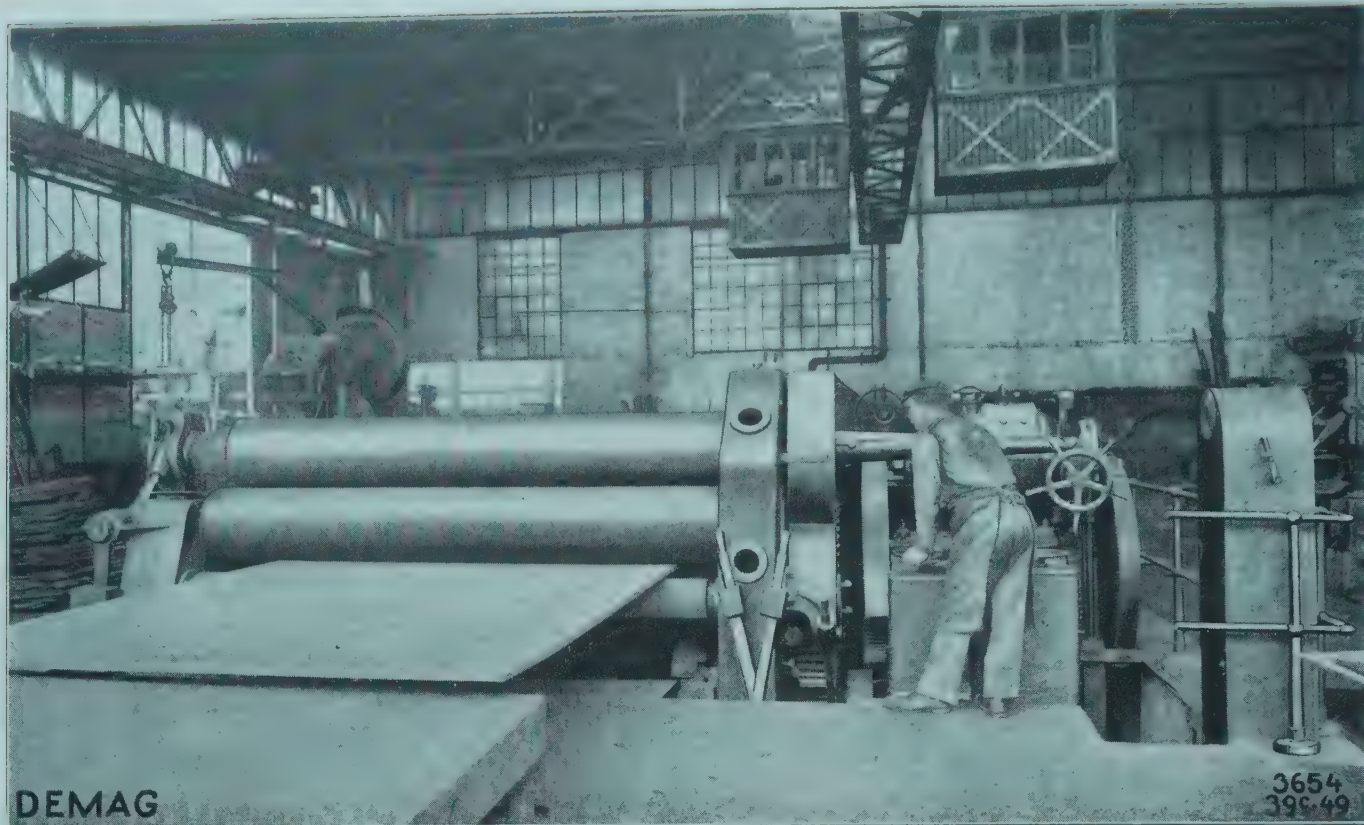
WITH DOUBLE CAP  
SEVERAL MADE



# THE ELECTRIC AND HYDRAULIC MACHINES FOR WORKING ORDINARY AND ARMOUR PLATES

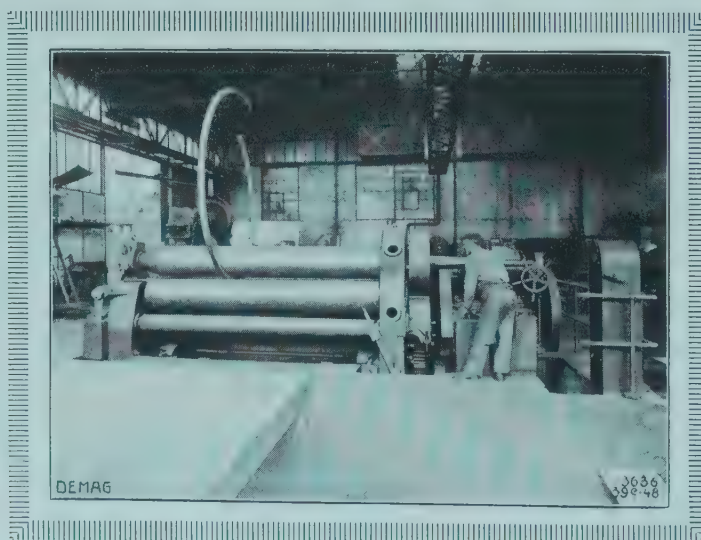
**T**he machines for working the finished plates according to the purpose for which they are to be used are manifold, so that we shall have to confine ourselves here to the illustration of but a few special machines for plates. In ship-building plate edge planing machines driven by electricity are employed for planing the long edges of the plates in order to obtain a perfectly square edge, which it is not always possible to attain with sufficient accuracy with the shearing machine. In these machines the plate is held by several holders or by magnetism, whilst the automatic reversing tool holder slide is pushed along the edge of the plate by an electric gear. Besides the above-mentioned machines punching machines have come largely into use in ship-building and constructional iron workshops, including some which punch rows of holes automatically, both quickly and with accuracy, the distance between the holes having been first adjusted. A machine to be found in all modern workshops where plates are worked is the bending machine, or for very heavy work the bending press, which we produce up to the biggest dimensions and highest pressures, for electric or hydraulic drive. For bending armour plates we have hitherto constructed presses with a pressing power up to 12000 tons. Boiler factories make use of riveting machines and presses, the latter for making the most varied descriptions of boiler ends, tank bottoms, manhole covers and yokes etc., etc., and flange presses for all kinds of bending work. We also make mention of the manhole shearing machines, which cut neatly through the plate at one cut, the tools for the desired hole having been first inserted. Till quite recently, and in some factories to this very day, this work was done by chiselling out the opening, or by burning it out by hand, a process which is very dear and causes a great waste of time. We deliver these shearing machines with all the cutting tools required for the most varied shapes of holes. Finally, we draw attention to the electric presses and bending machines for corrugated iron, which may be regarded as important machines for the working of plate metal, and which we have made of the latest and most approved constructions for all forms of corrugation.



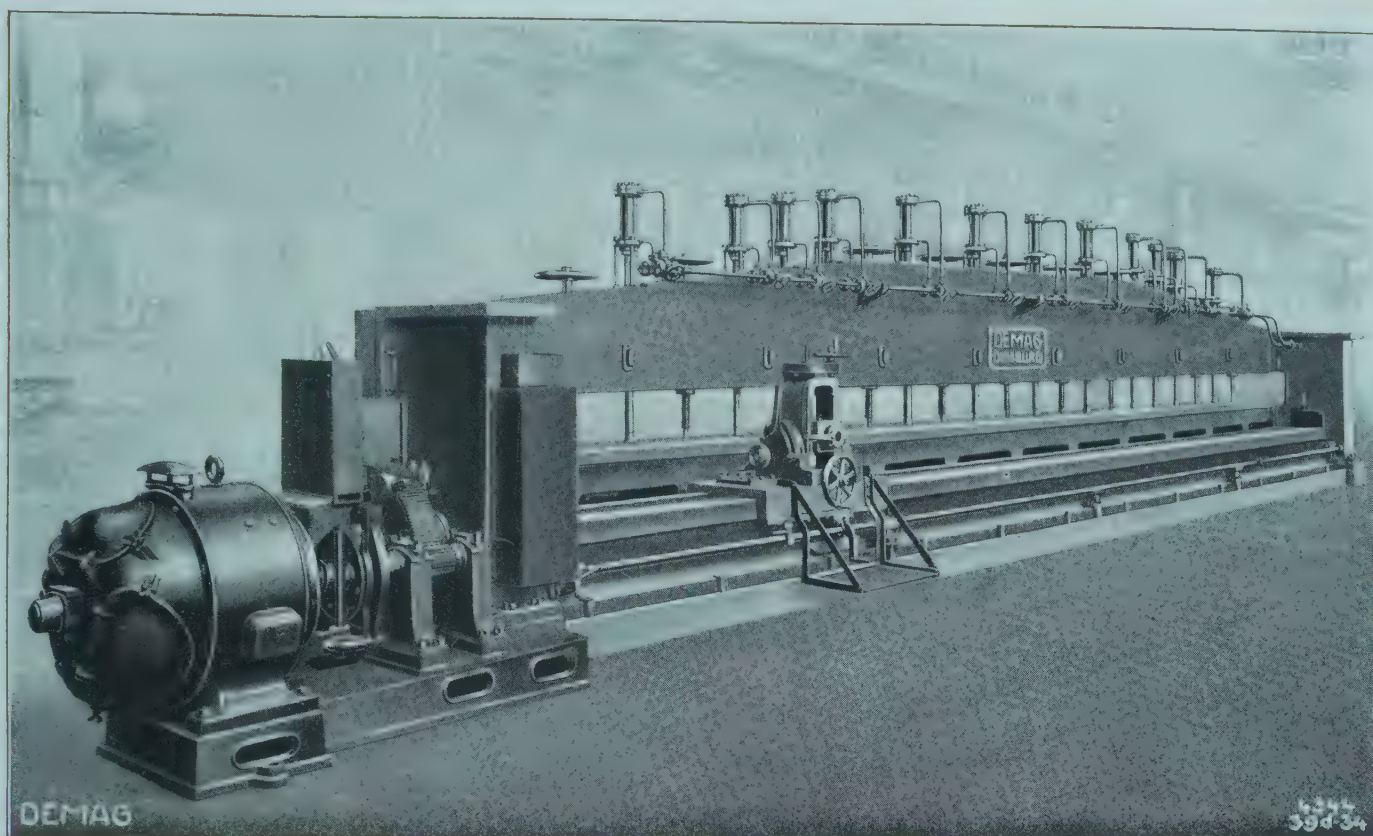


ELECTRIC COMBINATION STRAIGHTENING AND BENDING MACHINE, 3000×30 mm., STRAIGHTENING PLATES

THE SAME COMBINATION STRAIGHTENING MACHINE  
BENDING PLATES IN OUR WORKS  
AT BENRATH nr. DÜSSELDORF



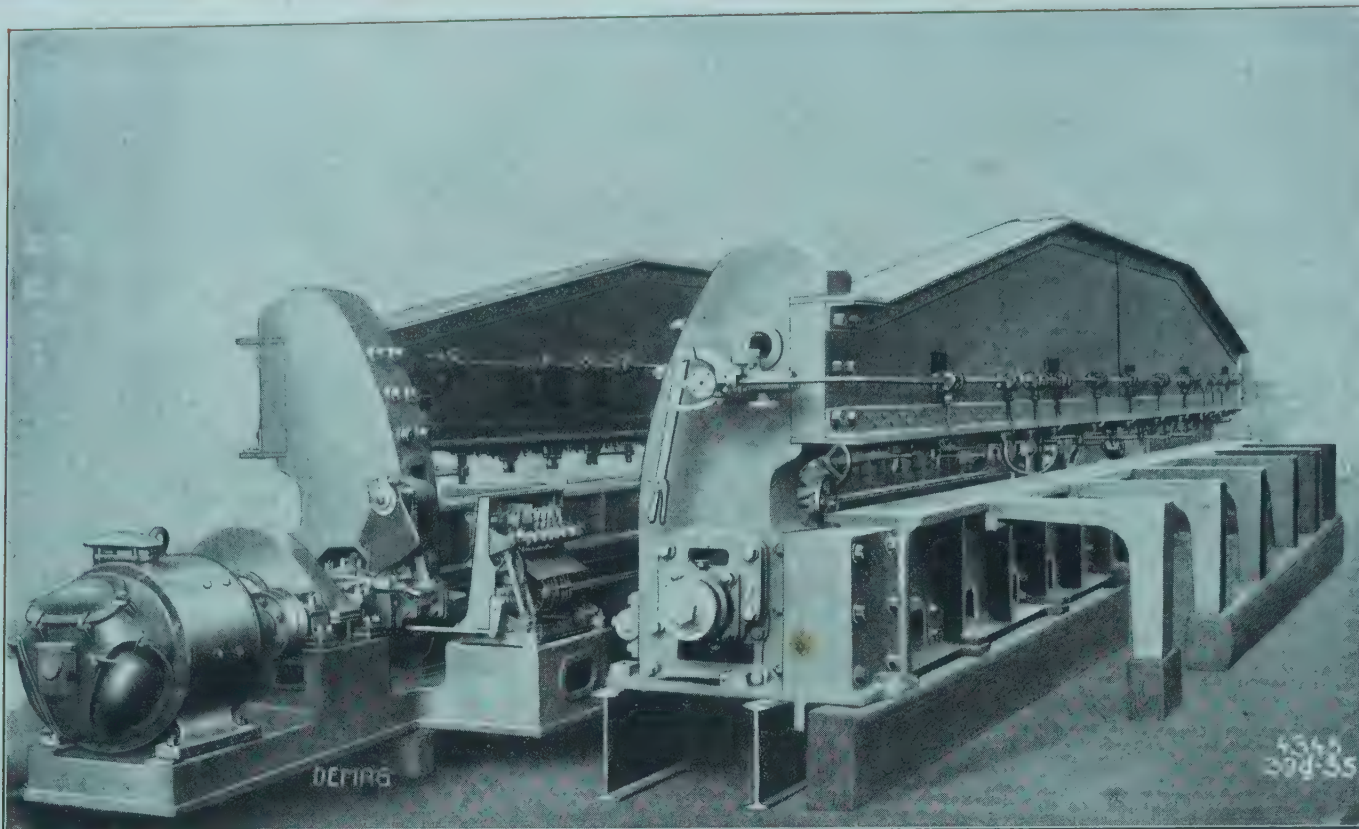




ELECTRIC PLATE EDGE PLANING MACHINE / DELIVERED FOR THE SHIPYARD OF BLOHM & VOSS, HAMBURG

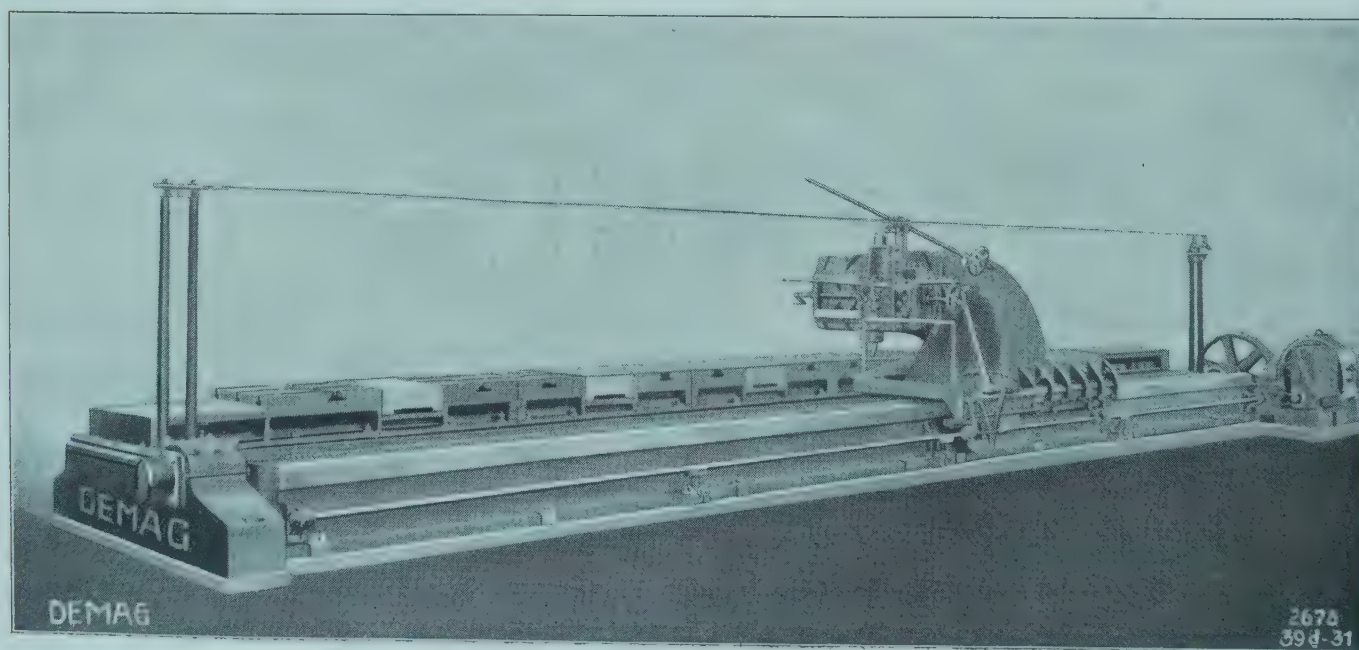
**T**his plate edge planing machine was constructed for a planing length of 10 metres. The plate is fixed by hand spindle and 12 hydraulic holders. The slide has turning steel and therefore works to the right and to the left. At the end positions the reversing for working the other way is effected automatically by a reversing motor. The spindle bearings are deserving of special attention. For the whole of its length the spindle lies in a half-round channel cut out of the bed, the upper half being encompassed by a nut. These bearings allow of good lubrication and enable the nut to be easily interchanged.



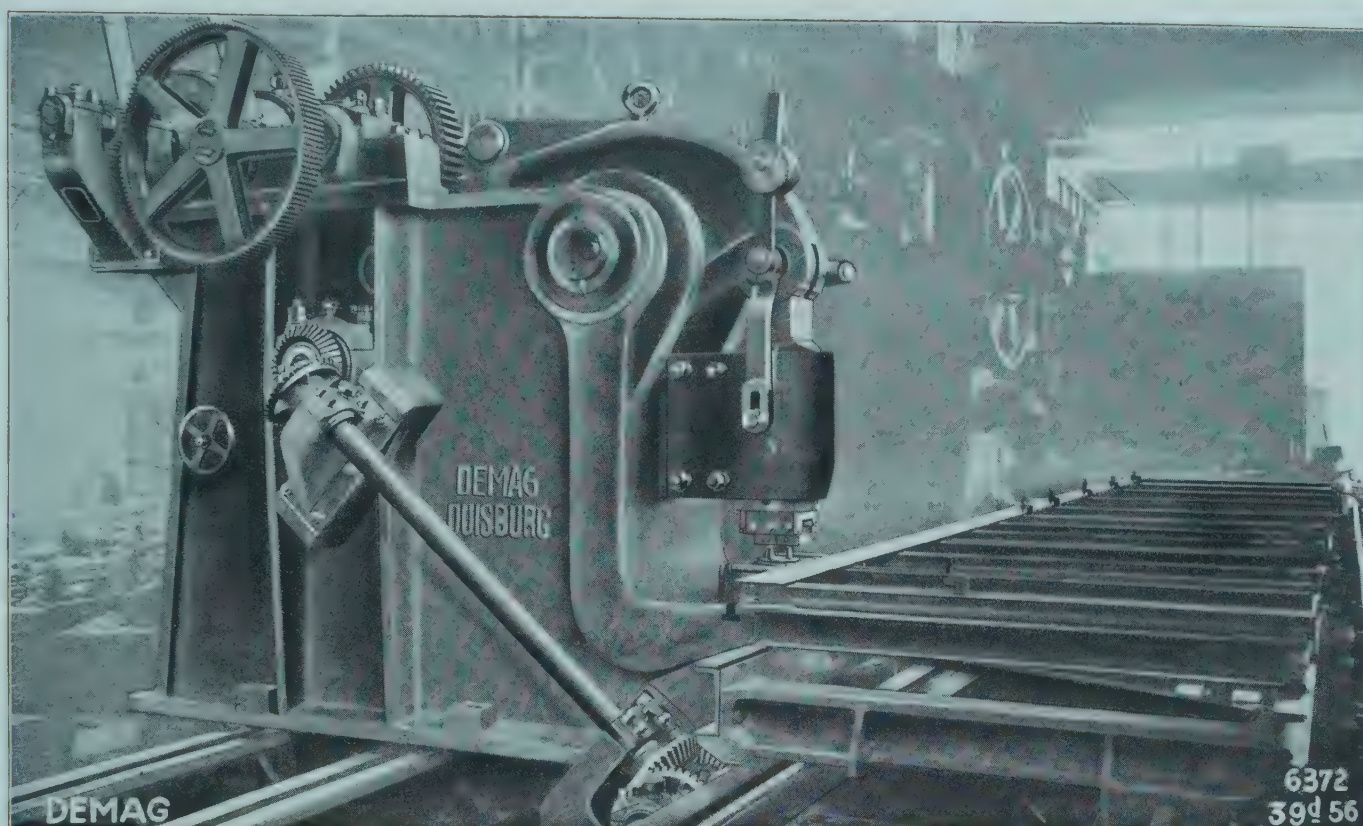


TWO ELECTRIC PLATE EDGE PLANING MACHINES  
DELIVERED FOR THE POUTILOV WORKS, ST. PETERSBURG

ELECTRIC ARMOUR PLATE PLANING MACHINE IN  
WHICH THE PLATE IS FIXED BY ELECTRO-MAGNETS

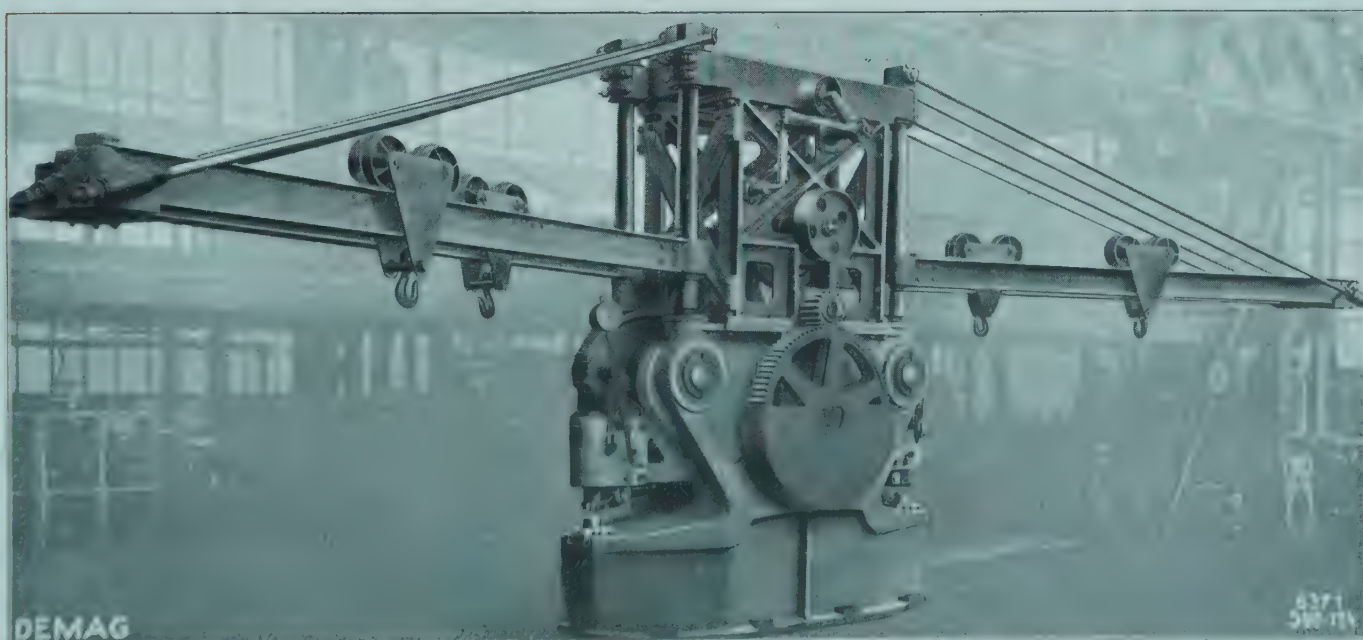




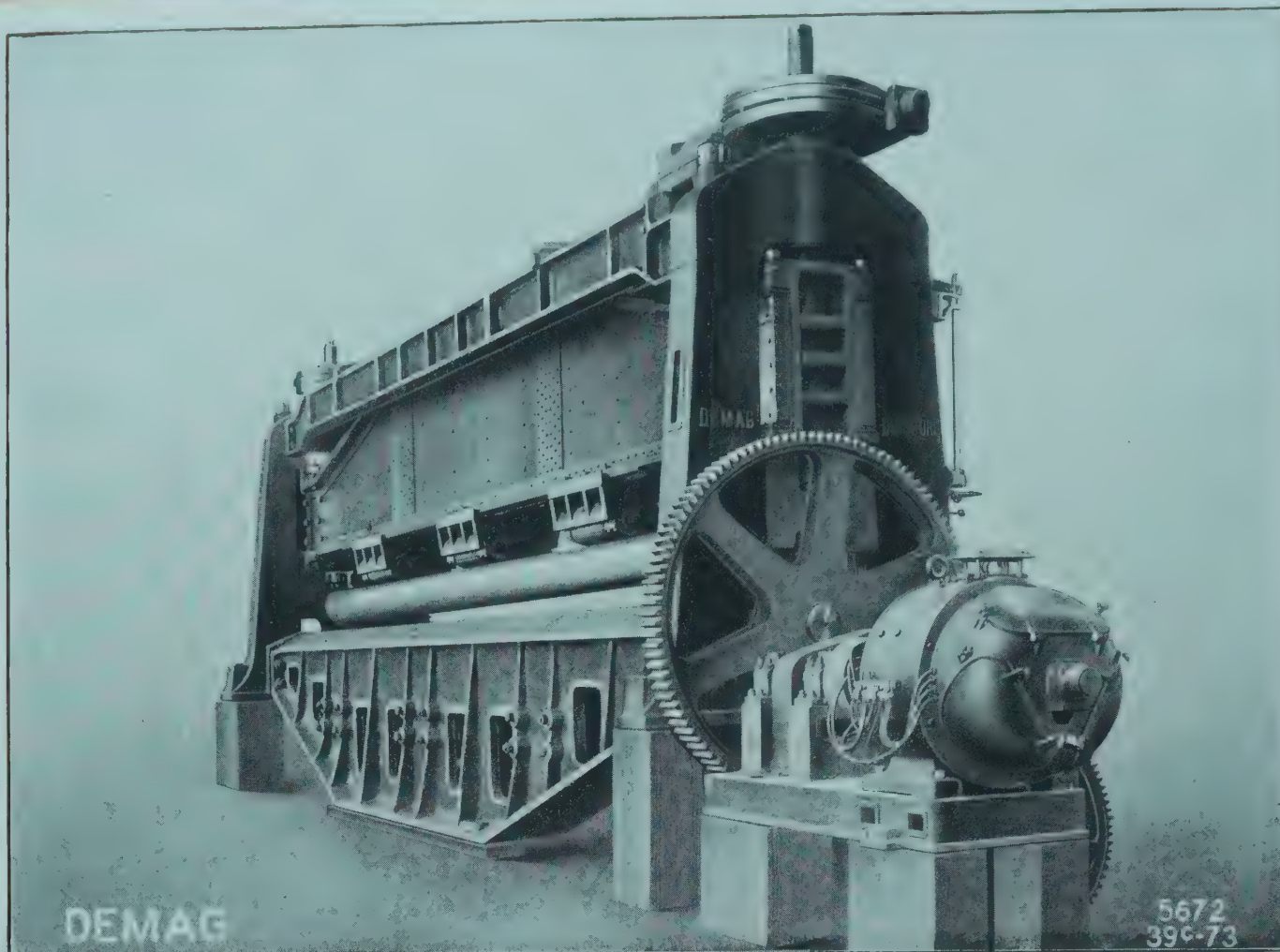


SIMPLE LEVER PUNCHING MACHINE WITH FIXING TABLE  
WITH AUTOMATIC FEED / KAISERLICHE WERFT, KIEL

DOUBLE LEVER PUNCHING MACHINE / DELIVERED FOR THE  
VULCAN-WERKE, HAMBURG UND STETTIN A.-G., HAMBURG

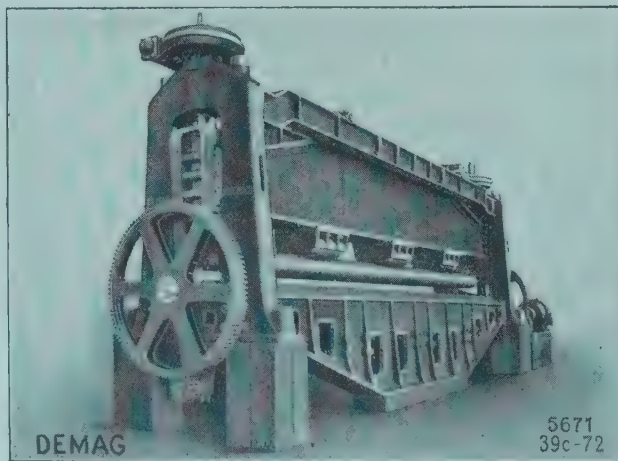






HEAVY ELECTRIC PLATE BENDING MACHINE FOR SHIPBUILDING PURPOSES / DELIVERED TO THE SHIPYARD OF F. SCHICHAU AT DANZIG

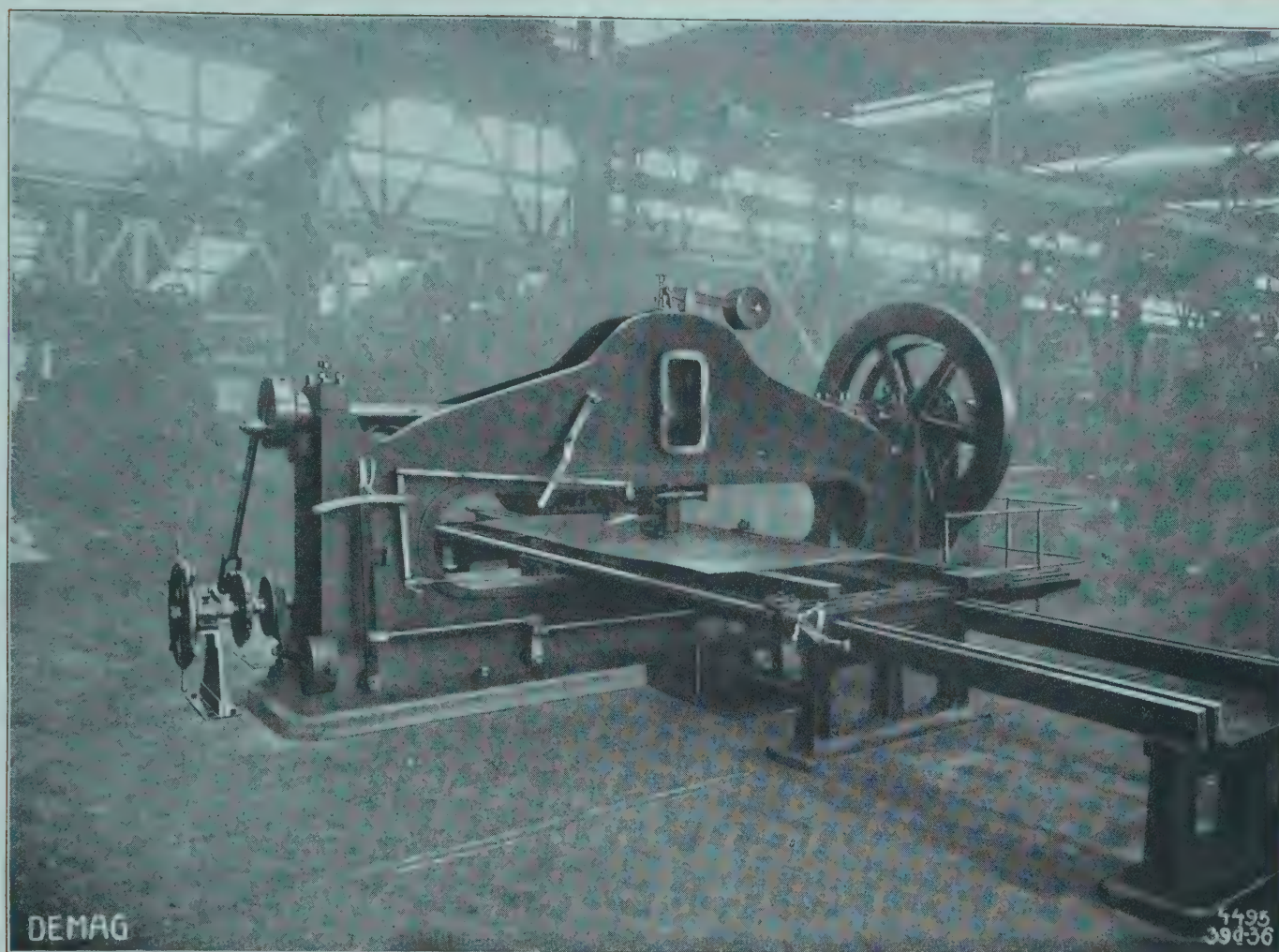
**O**n this machine plates up to 11 metres long and 26 mm. thick can be bent and straightened cold. Each of the three bending rolls is threefold supported by supporting rolls in strong brackets. The two lower rolls are driven by electricity with spur wheels. The height of the top roll can be adjusted by electricity; it is also possible to give this roll a certain inclination to the horizontal when the plate are to be given a conical bend.



Heavy electric plate bending machine for shipbuilding purposes.

Delivered to the shipyard of F. Schichau at Danzig.

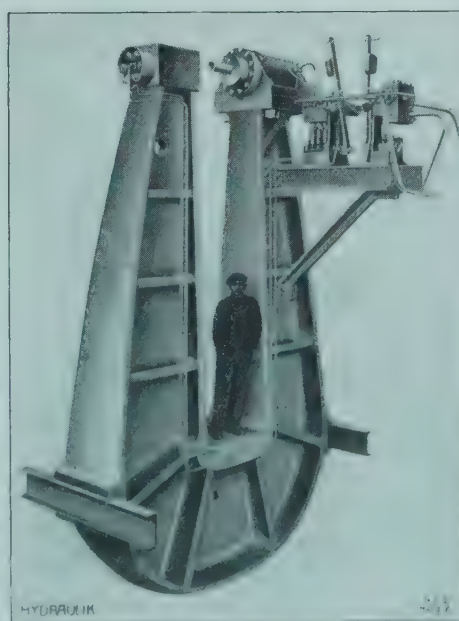




## AUTOMATIC PERFORATING MACHINE FOR MAKING PERFORATED PLATES / FOR OUR WORKS AT BENRATH

**T**he above perforating machine is constructed for belt drive and punches plates up to 10 mm. thick, 1200 mm. broad and of unlimited length.

The punching is done with several tools, each of which can be disengaged separately, at the same time.

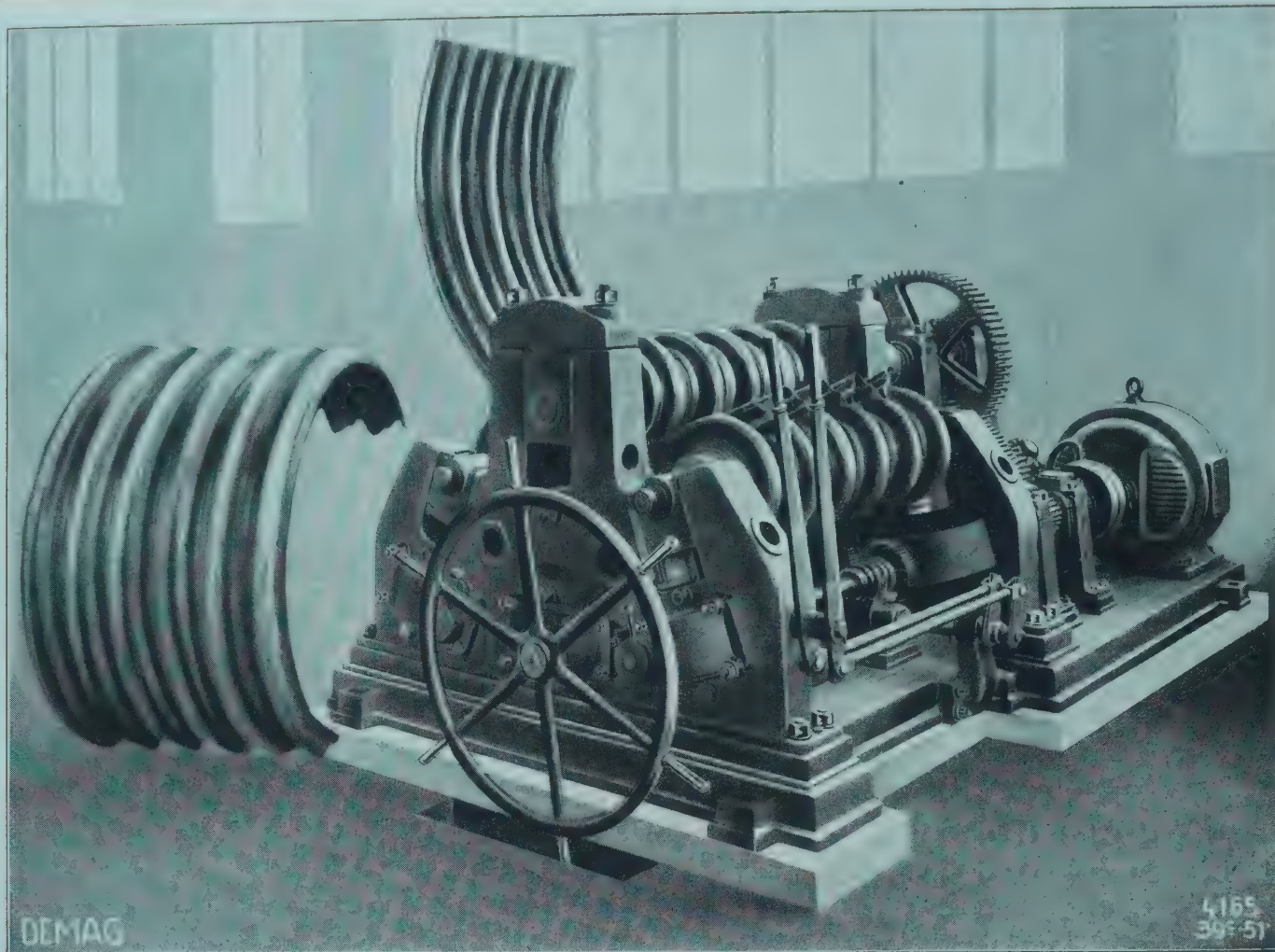


**Heavy hydraulic RIVETING MACHINE.**  
We construct riveting machines of all types

The table on which the plates are fixed moves forward automatically. The stroke may be adjusted to any size.

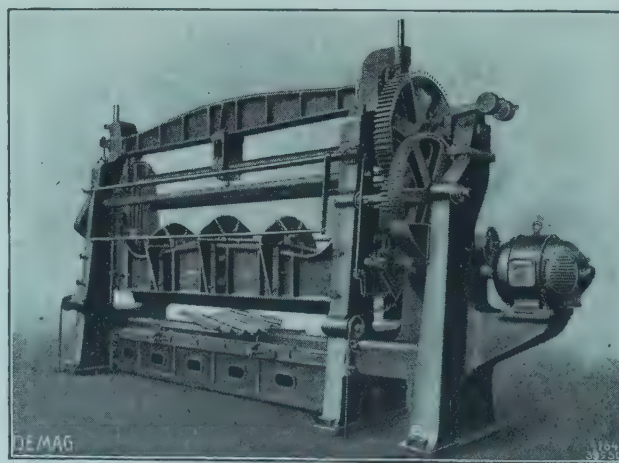
with and without plate closer, stationary and travelling, for all outputs, also for pin riveting.



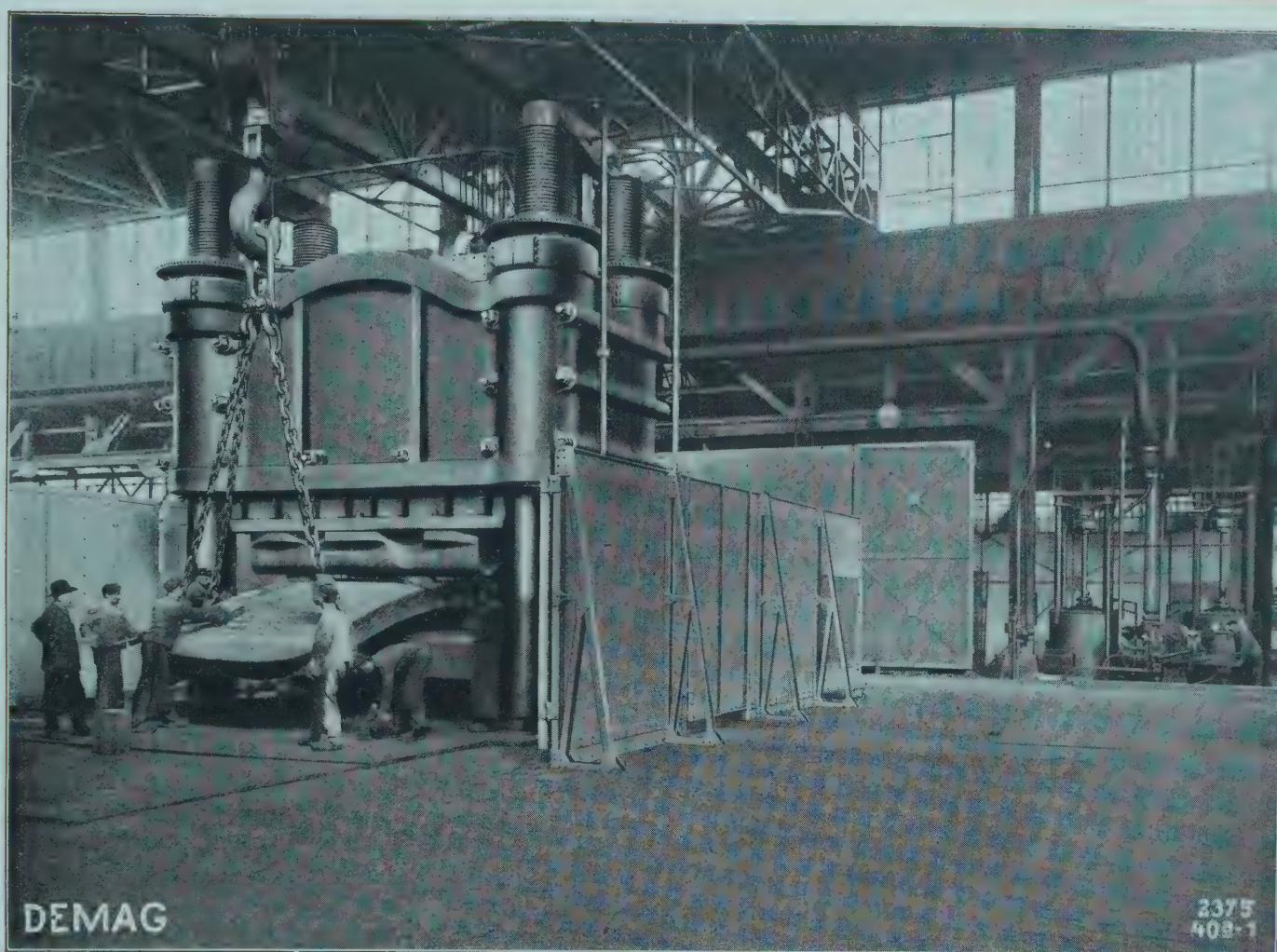


## ELECTRIC EQUALISING AND CURVING MACHINE FOR DOUBLE CORRUGATED IRON SHEETS

Corrugated iron press for sheets up to 4 metres broad, 2 mm. thick and corrugation to a depth of 200.; electric drive. / Delivered to the Petersburg Metal Works, St. Petersburg.







HYDRAUL. ARMOUR PLATE BENDING PRESS FOR 10000000 KIL. PRESSURE

**I**n connection with the "Hydraulik G. m. b. H., Duisburg", which was established some years ago by us and the firm of A. Borsig in Berlin-Tegel we construct hydraulic machines of all kinds, especially hydraulic presses of the greatest dimensions and outputs for the production of modern war supplies, such as forging blooms of steel into armour plates, and trimming the edges and bending the latter. We have already made large numbers of presses for pressures of 3000, 7000, 10000 and 12000 tons. Our presses are distinguished for the ease with which they can be served, so that in nearly every case a single lever judiciously moved during the pressing-process, which a workman can manage without any trouble, is sufficient. For all parts of the presses we use the very best material and we are always endeavouring to make the best use of the latest improvements in the production of the material. On the following pages we give a few illustrations of presses specially constructed for the working of plates. Moreover we refer to special pamphlets which give detailed information about all hydraulic machines and apparatus.



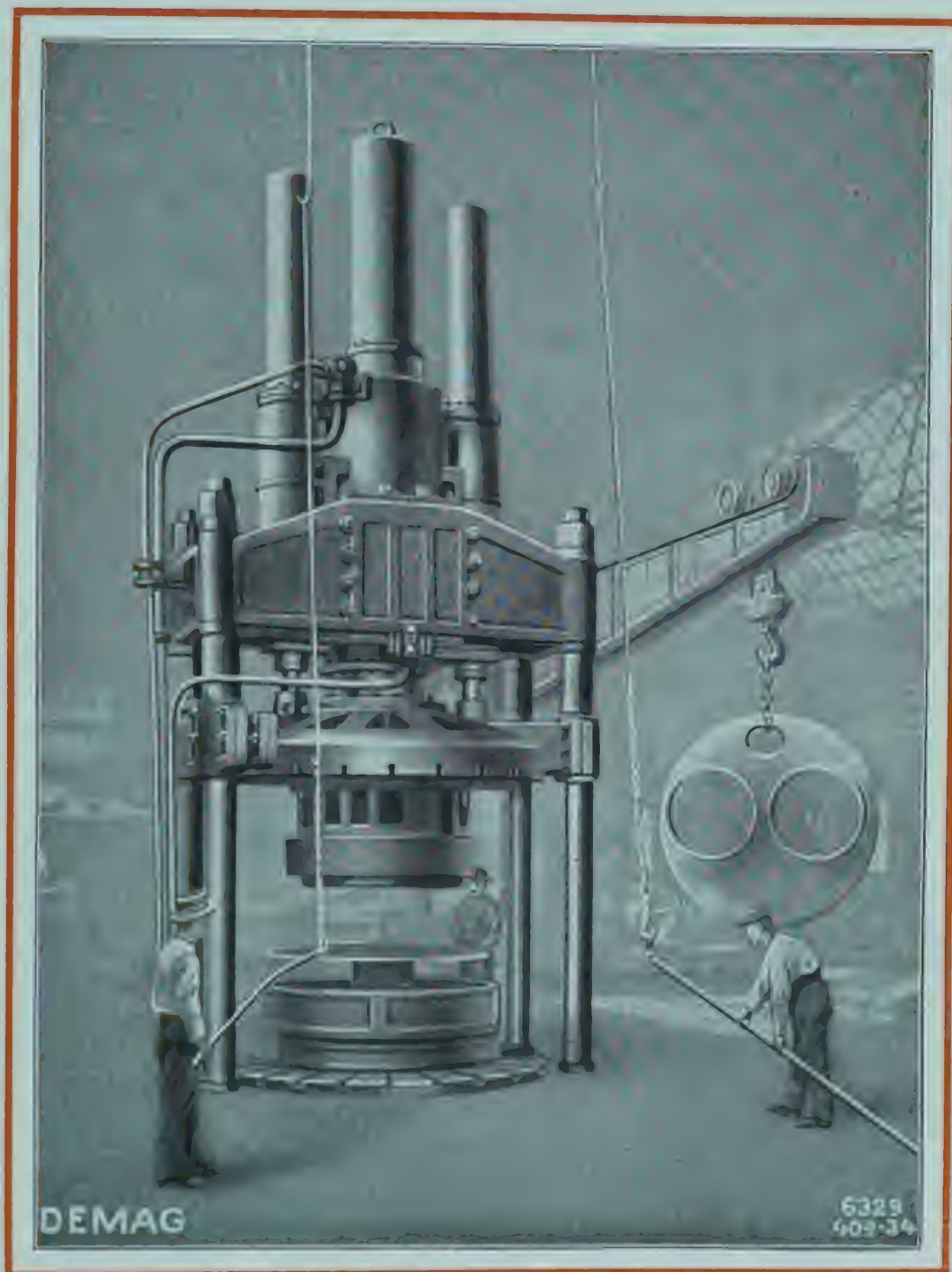
## STEAM HYDRAULIC FLANGING PRESS



The flanging press illustrated on this page works with the help of an automatic double acting power gear, which produces a hydraulic pressure of 200 atm. with 7 atm. steam pressure. The upper pressure amounts to 300 000 kilos, the lower one to 200 000 kilos. On both sides the stroke is 1800 mm.



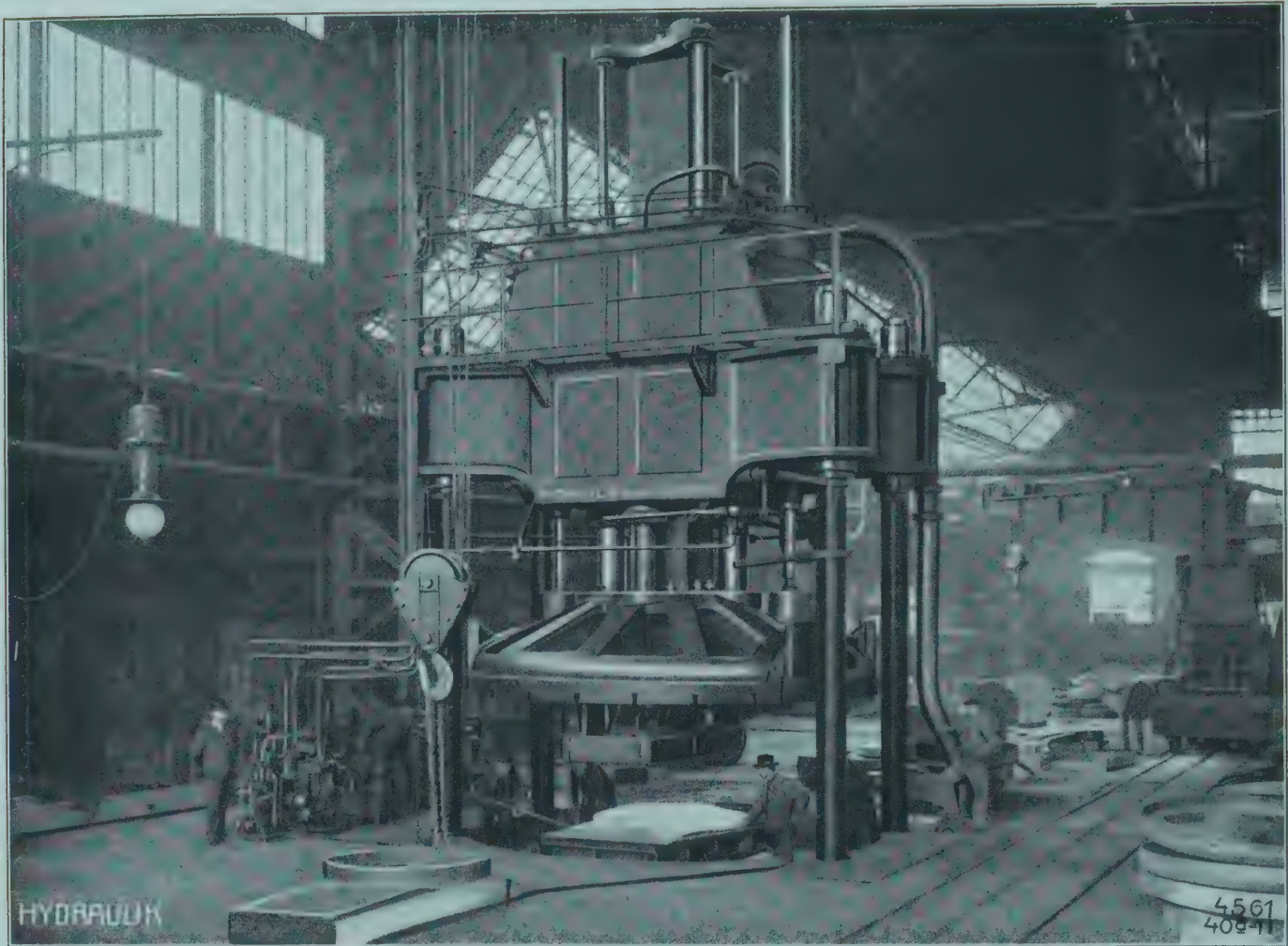
# PURELY HYDRAULIC HIGH SPEED FLANGING PRESS



WITH UPPER AND LOWER  
PRESSURE



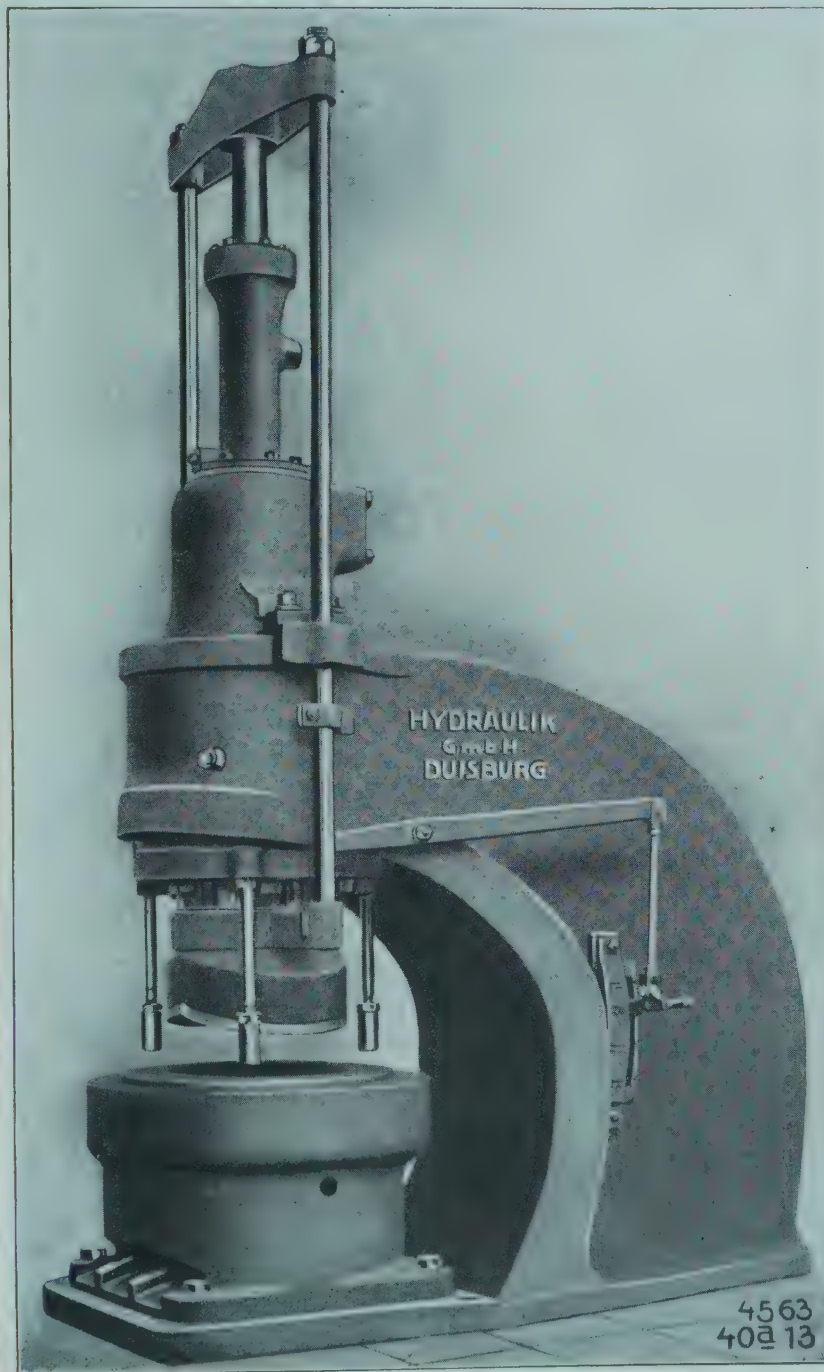
# HEAVY HYDRAULIC HIGH-SPEED FLANGING PRESS



This press is one of the biggest high-speed flanging presses ever erected. It weighs about 400 tons, works plates up to a width of about 4.7 metres between the columns, and is able to flange the heaviest boiler ends etc.

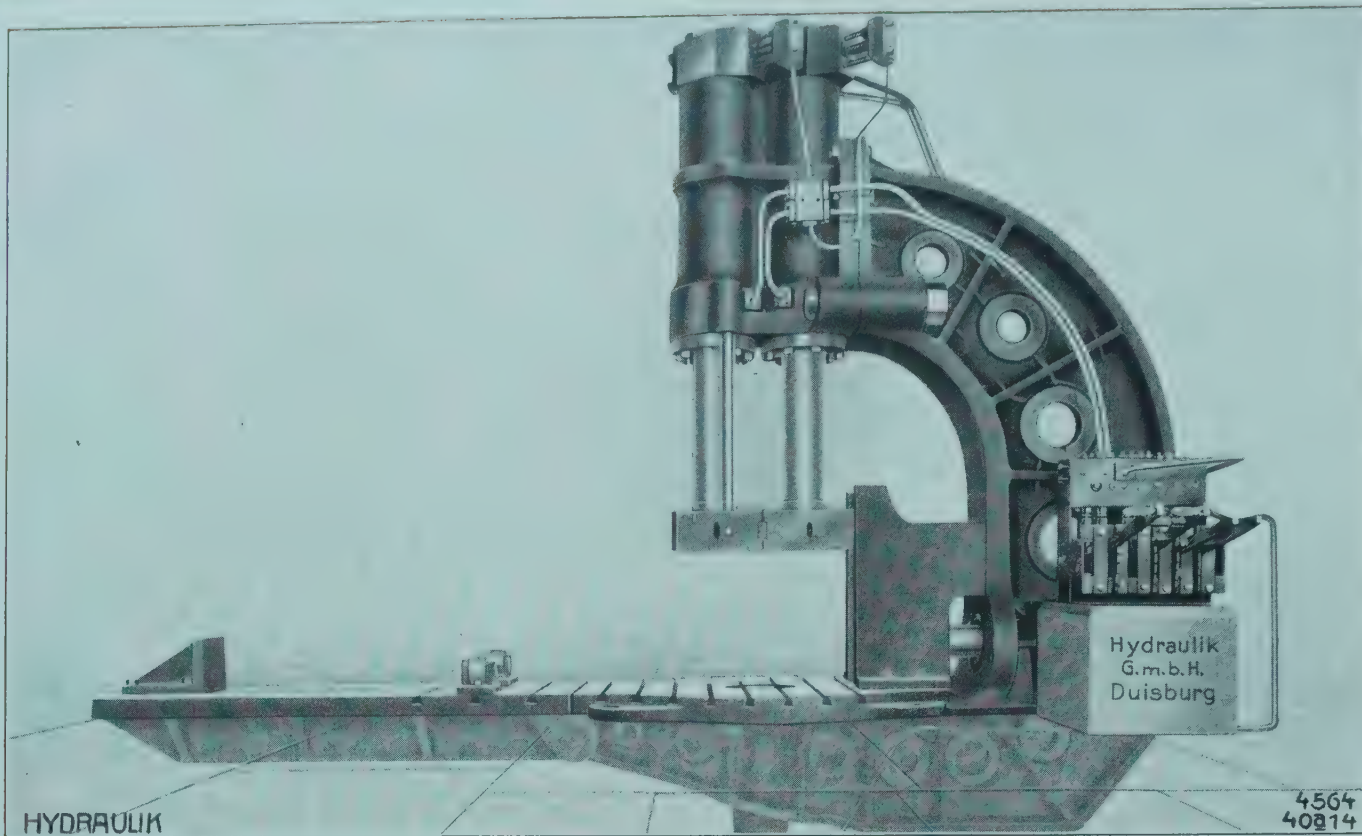


## HYDRAULIC MAN- HOLE SHEARING MACHINE



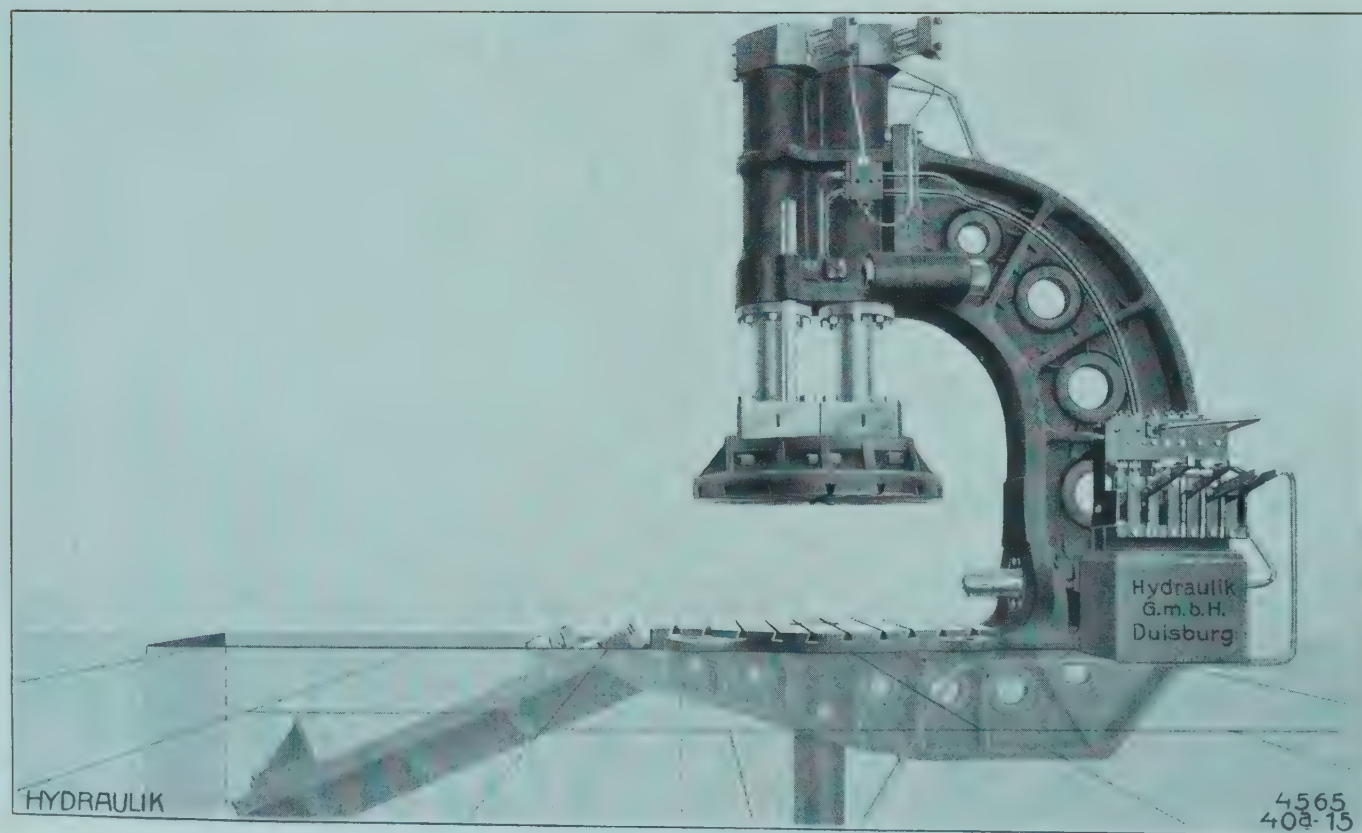
On special request we deliver with this machine  
the complete cutting tools for the most varied  
range of dimensions of the hole.





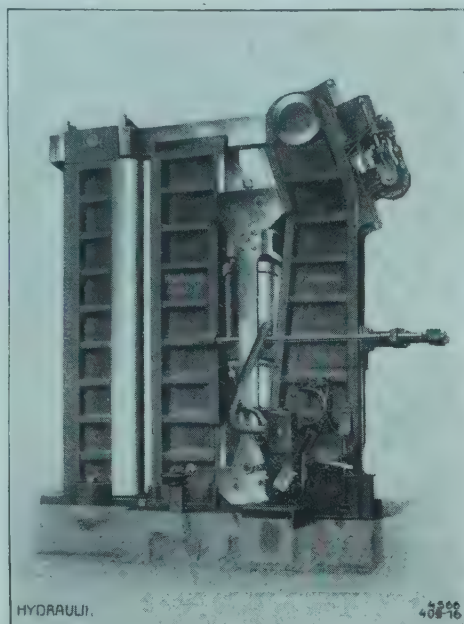
## UNIVERSAL FLANGING PRESS

for flanging the edges of boiler ends and for pressing dome crowns and manhole flanges. The press also serves for boiler tube flanging and for jumping stay tubes.

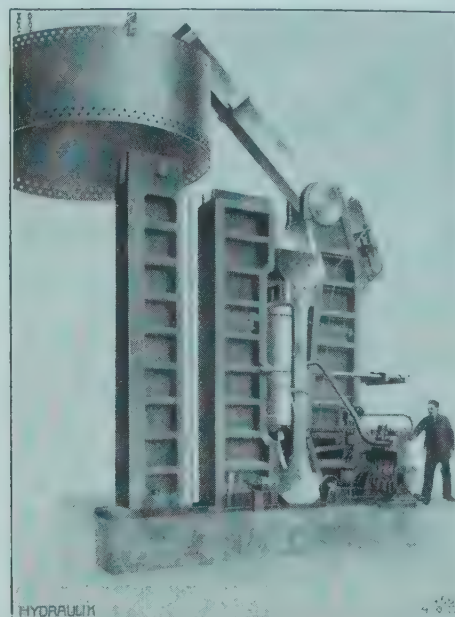




## VERTICAL HYDRAULIC MULTI-STAGE PLATE BENDING PRESS

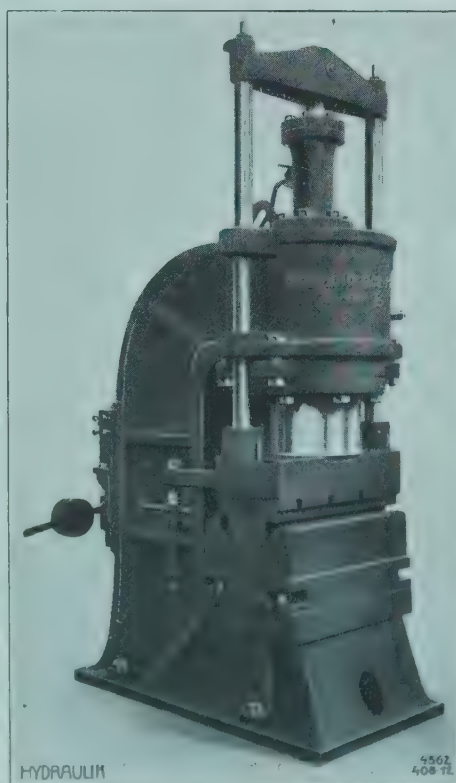


..... for .....  
bending plates  
up to 4000  
mm. broad and  
60 mm. thick.  
A hydraulic  
preliminary  
pressure cylinder  
causes  
these presses to  
work very economically. The  
upper connecting  
rod is also  
disengaged by



hydraulic power. A hydraulic pulley block makes it easy to push forward the  
plates to be bent. The end traverse is often made rotary.

## PURELY HYDRAULIC PLATE BENDING PRESS

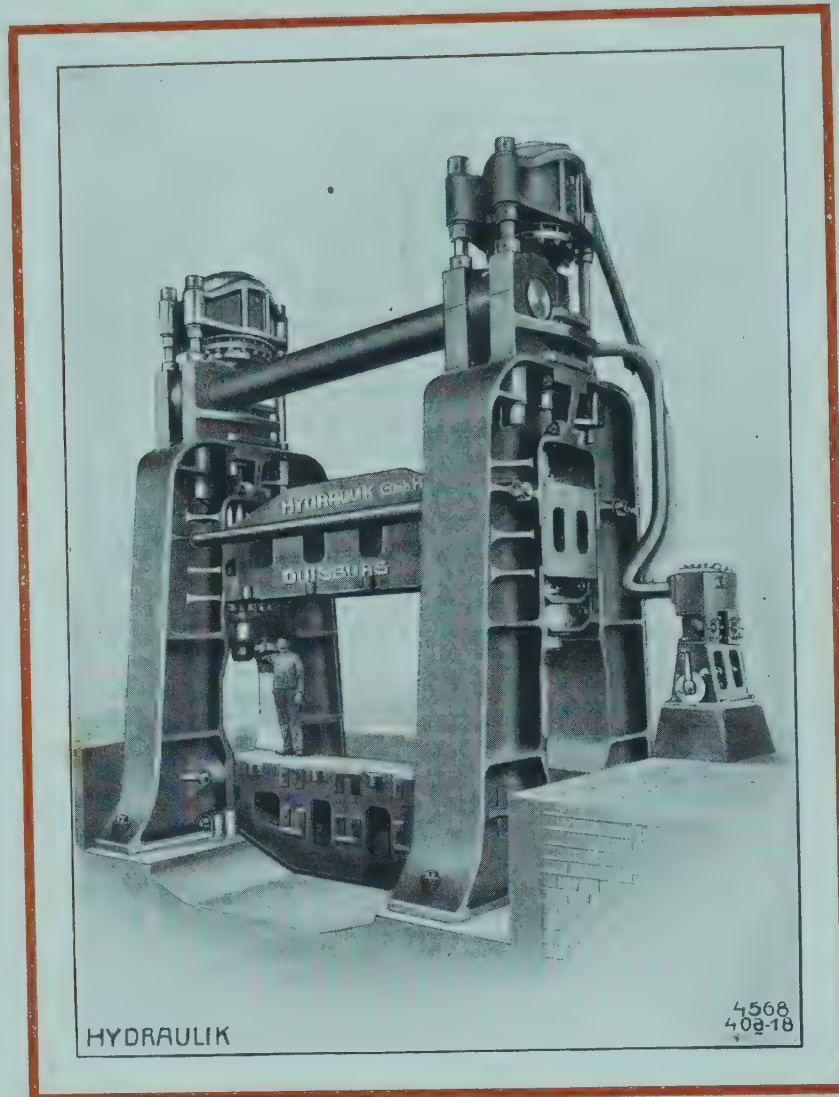


This press serves not  
only for bending boiler  
shell rings but is also  
made for bending large  
welded tubes with the  
use of suitable tools. For

this purpose it is also  
fitted with an automatic  
stroke regulation on  
special request. The press  
is also adapted for pun-  
ching fairly large holes.



# HEAVY HYDRAULIC

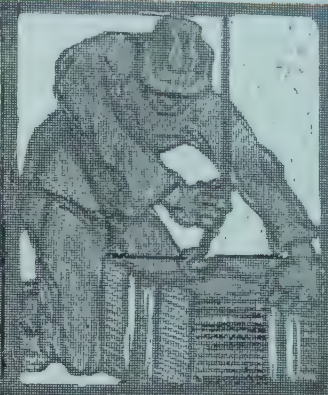


## PLATE STRAIGHTENING MACHINE





## THE THIN SHEET ROLLING MILL



**T**he group known as "Plate Rolling Mills" comprises all those plate rolling mills which produce plates less than 3 mm. thick out of all kinds of metals, such as iron, steel, copper, brass, aluminium, lead etc. The maximum length of these plates is about 4 metres, the greatest width about 1500 mm. Thin plates are used for tanks, lagging, roofing etc., and in the electrical industry for making the casings of transformers and so on. There is quite a large demand for thin plates in the pan and enamelled goods industry, the products of which are often tinned, galvanised or enamelled, to protect them from oxidation, to make them less sensible to heat and easier to keep clean. If plates are to be plated with tin, nickel or copper they must first be given a smooth surface, which can be attained by means of the so-called dressing or polishing mill. The rolls of these special rolling mills are of best special chill castings or of forged steel, and are highly polished. The electric or steam drive of fine plate rolling mills is for the most part indirect, by means of rope or belt transmission or by tooth gear. The mills generally consist of one cogging mill and one to three two-high finishing mills according to the rolling process in use. Where the thickness of the material to be rolled is less than 30 mm. the top roll often runs loose, as a skidding roll, but for greater thicknesses the top roll is also driven. The adjustment of the top roll is effected by a hand wheel or a hand spanner, and only for thicker and longer plates is the adjustment electric or hydraulic. For plates of 1×2 metres and upwards the material is returned over the top roll by oscillating or lifting tables worked either by steam, hydraulic, electric or pneumatic power, by transmission, by foot or by hand, according to local circumstances. When making very thin plates (less than 1 mm. thick), such as plates for punched metal work, or for making utensils or tin-plate, it is necessary to fold the plates once, sometimes more, in order to get them thin enough; this is done in front of the rolling mill by the doubling machine.



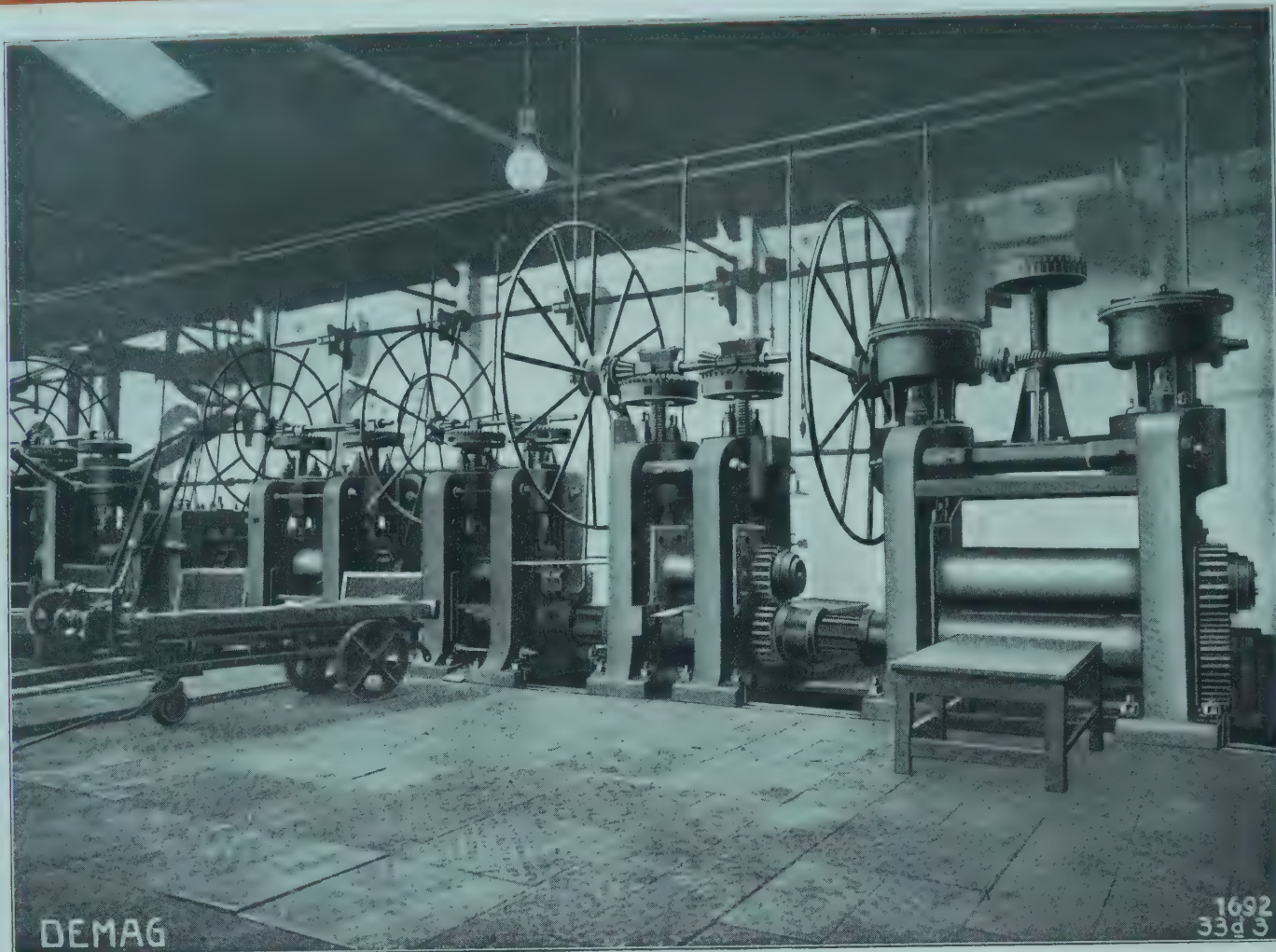
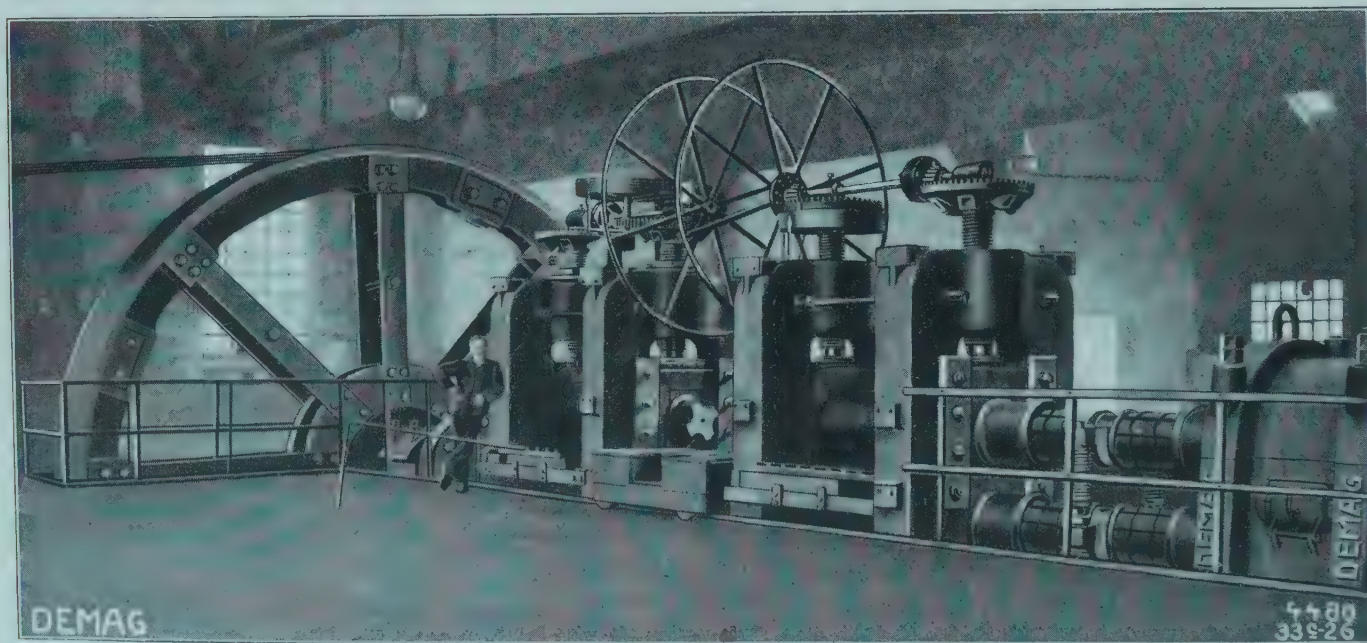


PLATE ROLLING MILLS / DELIVERED FOR THE DÜRENER  
METALLWERKE AKTIENGESELLSCHAFT, DÜREN, RHINELAND

PLATE ROLLING MILLS CONSISTING OF TWO HOUSINGS  
DELIVERED FOR GEBRÜDER ARNS, REMSCHEID

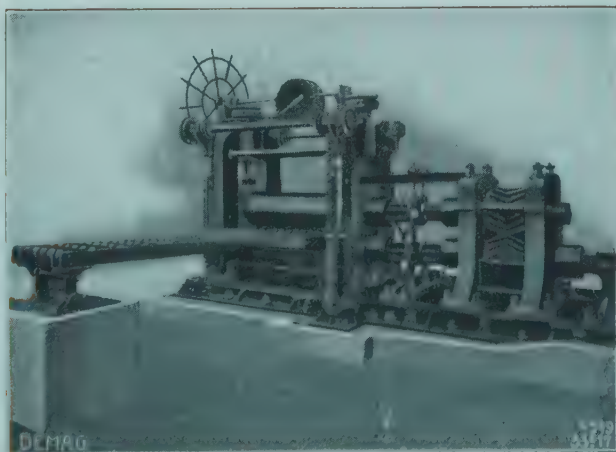




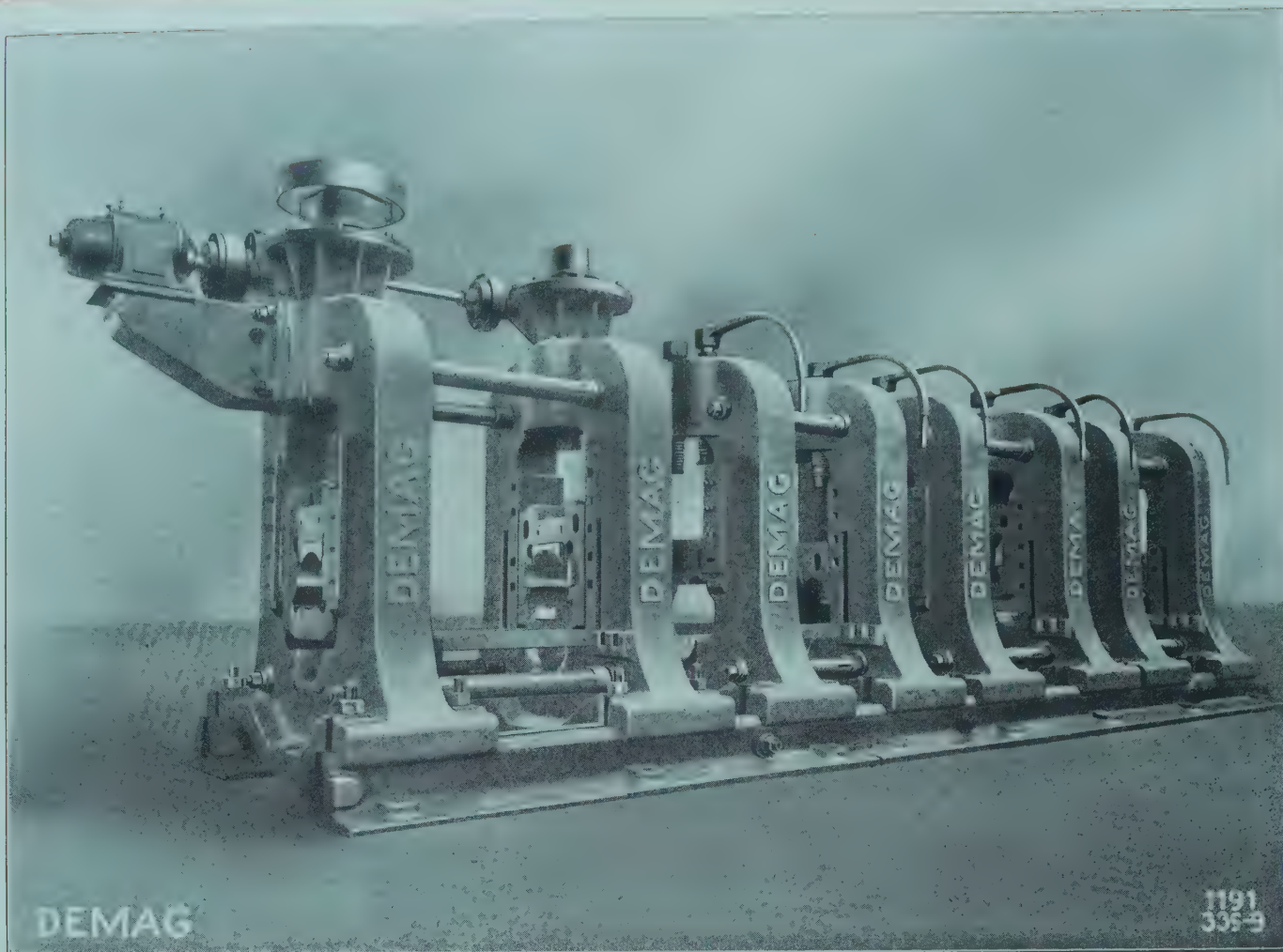


ROLLING MILL OF TWO HOUSINGS FOR THIN COPPER PLATES  
DELIVERED FOR SOC. LIGURE RAMIFERA IN CASARZA (ITALY)

**T**he diameter of the rolls is 650 mm. and their barrel lengths 1500 and 1800 mm. respectively. The small steam cylinder underneath the ground is connected with a cataract cylinder and lifts the oscillating tables, the control being effected automatically by the operator stepping sideways onto a rocking foot-plate. The lower illustration shows a rolling mill for copper plates delivered to the same firm.

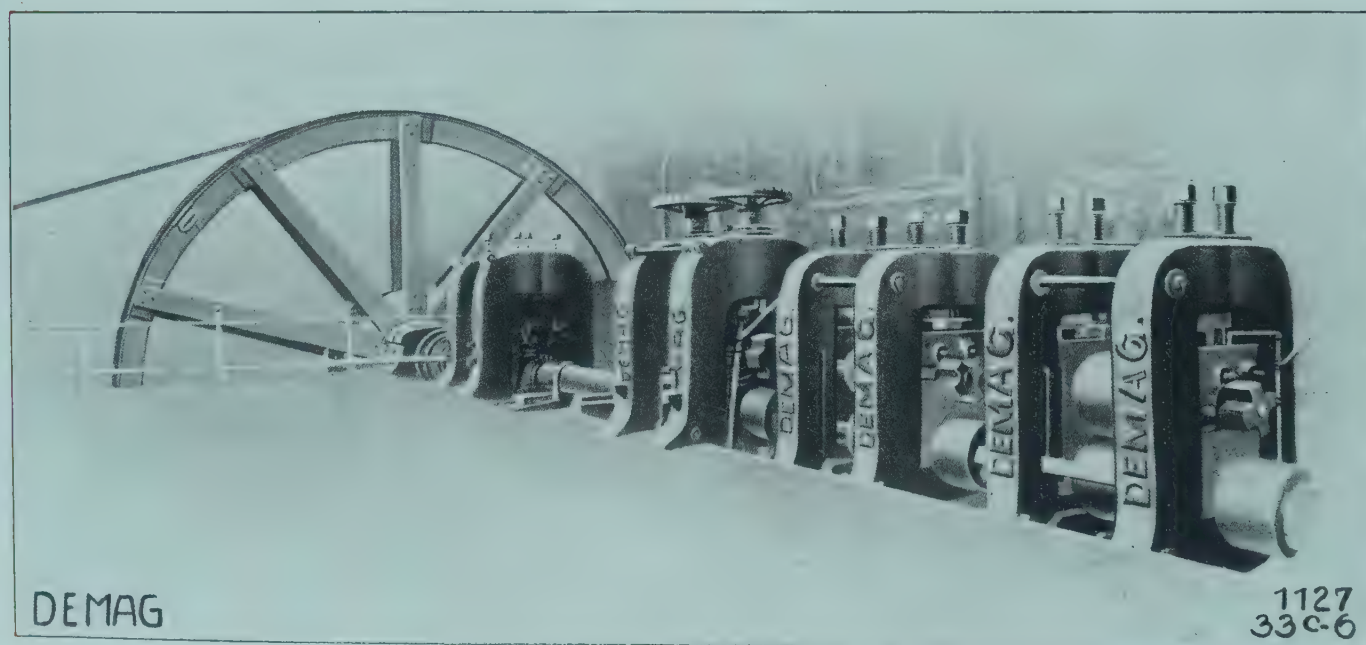




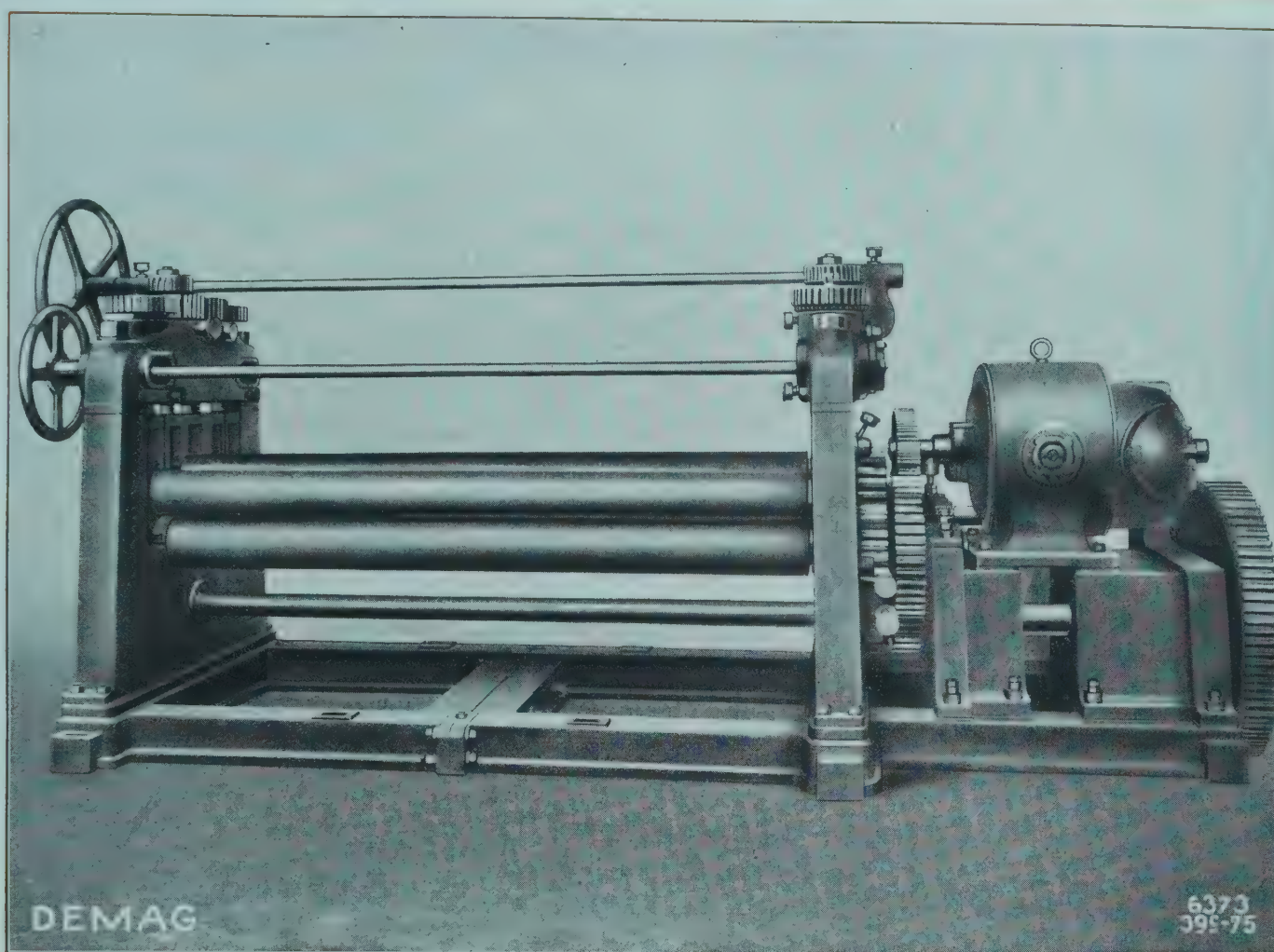


THIN PLATE ROLL. MILL OF FOUR HOUSINGS, FROM A PHOTOGR. TAKEN  
IN THE WORKSHOP / DELIV. TO THE ALEXANDERWERK JEKATERINOSLAW

THIN PLATE ROLLING MILL / DELIVERED FOR THE ESKILSTUNA  
STALPRESSNINGS AKTIEBOLAG, ESKILSTUNA (SWEDEN)

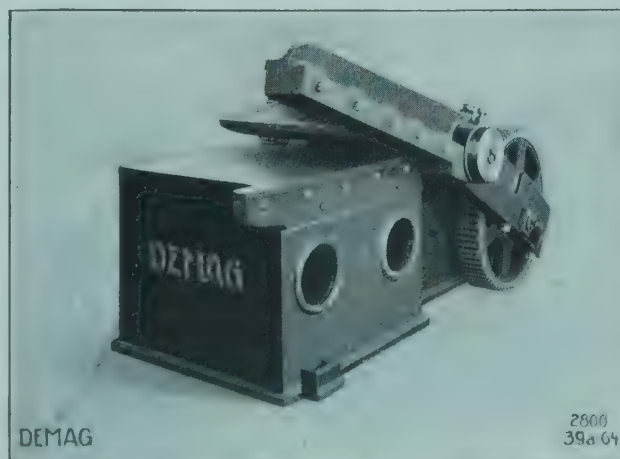






ELECTRIC PLATE STRAIGHTENING MACHINE FOR PUNCHED PLATE  
 $2000 \times 8$  mm. / DELIVERED FOR EBERHARD STAHLSCMIDT, KREUZTHAL

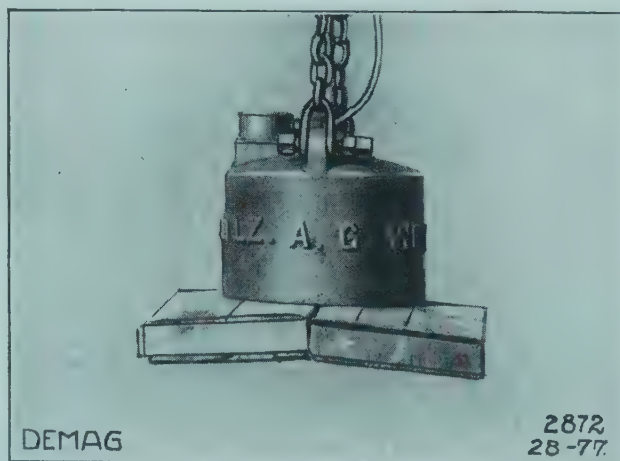
ELECTRIC PLATE SHEARING MACHINE WITH PLATE DOUBLER BUILT AS  
 ONE MACHINE. LARGE NUMBERS MADE





# LIFTING MAGNETS FOR TRANSPORTING PLATES

**D**emag lifting magnets are distinguished for the safety with which they work, their high lifting power and the slight wear and tear of the parts. Those parts subject to wear and tear are so arranged as to be easily interchangeable. We attach great importance to careful workmanship and fitting of the coils of our magnets, which is a great point, especially in the large types, the coils of which sometimes weigh 1000 kilos. The method of attaching the coils, which we have protected by German patent, enables even unskilled persons to attach and detach the winding very easily for the purpose of inspection. It is impossible for them to damage the coil in doing so, it being well protected on all sides after being removed. / Our large stock of all spare parts enables us to deliver lifting magnets and accessories for the usual voltages of 200 to 250 volts and 440 to 550 volts continuous current, in most cases immediately. For magnets of other voltages, too, we require only a very short time of delivery. / Any crane already in use can be fitted with our magnets, this requiring only the attachment of a registered automatic cable drum. The latter can be attached without difficulty anywhere, even to cranes working in the open air. For three phase plants we also deliver approved converters of special type. / In the manufacture of our lifting magnets we make use of the very best material only, for permanently reliable magnets can only be constructed with the best material and most careful workmanship. The higher prime cost thus incurred makes itself paid in a very short time, for breakdowns are always expensive and cause a waste of time.



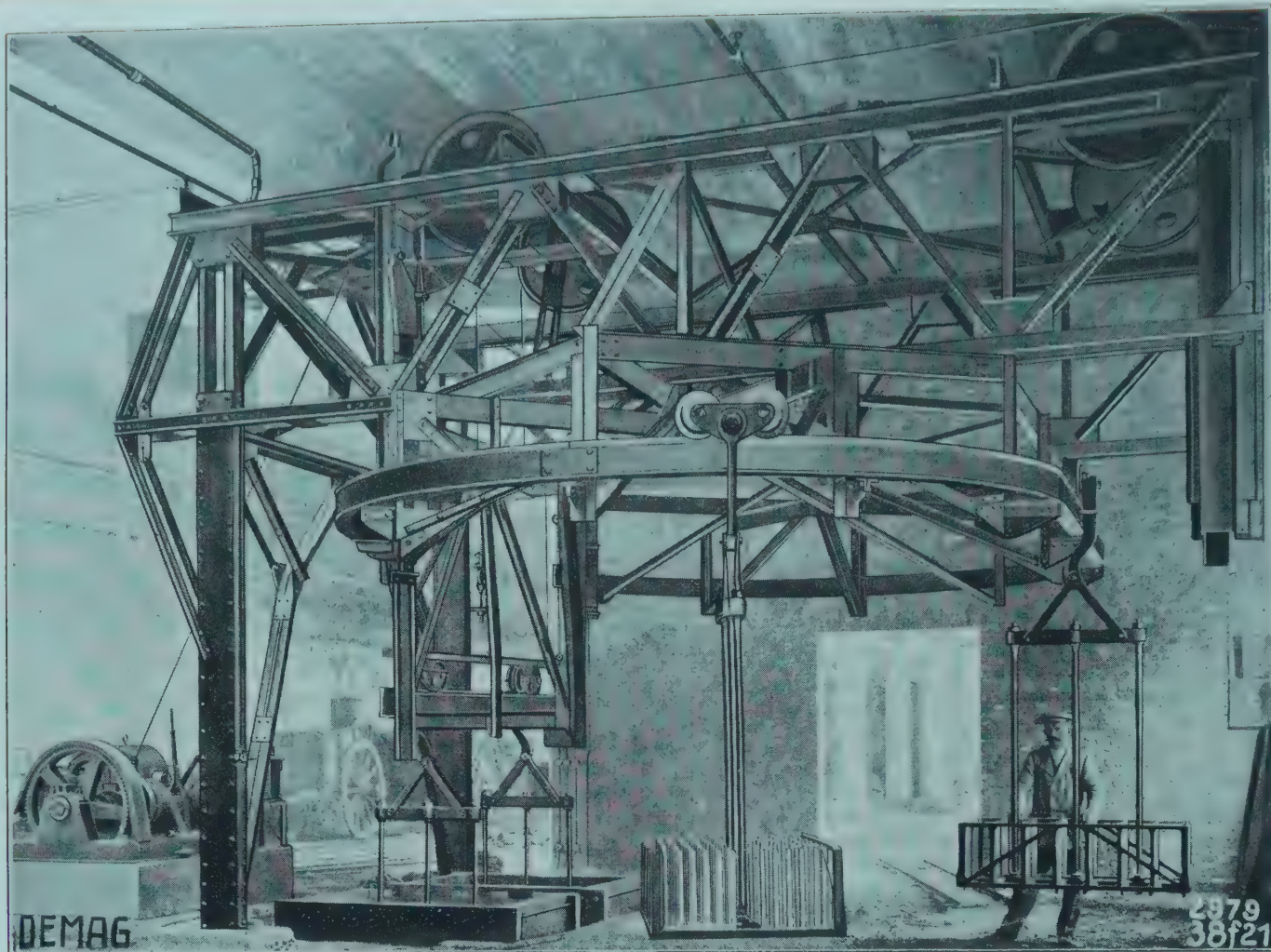
MAGNETS TRANSPORTING  
PLATES PACKED IN CASES



# PICKLING IN THE PLATE ROLLING MILL

**T**he application of pickling is very manifold, and is to be employed where objects are to be plated with metal. The object of the pickling process is to remove the layer of oxide arising from the effect of the air when annealing the plates and the scale still remaining from the rolling process, so as to render the surface as perfect and as purely metallic as possible. In plate rolling mills the pickling is employed in the making of tinned and galvanised plates. The advantage of mechanical pickling over stationary pickling consists not only in the much greater efficiency but also in the saving in wages and cost of transport. Moreover, less room is needed for the pickling shop. In mechanical pickling the time required is much shorter, owing to the material being moved up and down, the friction arising between the material and the fluid removing from the surface of the object to be pickled the gas blisters formed in the pickling process and enabling the pickling acid to come into quicker and more constant contact with the material. The pickling plant may be driven by electricity or by steam, but the former method is by far the more popular because of a number of advantages it offers. The main parts of the electric pickling plant are the patent driving machines, the pickling frame with its crane track and the device for the lifting and lowering motion in the pickling trough. The pickling cages hang on small easy-running crabs which run on straight or looped aerial railways. The pickling process is as follows: The acid proof cage laden with the material to be pickled is pushed along the movable part of the track, the highest position of which corresponds with the height of the rails of the aerial railway. After pawls have been disengaged the lifting traverse with the loaded cages sinks by virtue of its own weight, being braked with a hand brake. Meanwhile the lifting rope uncoils itself from the rope drum and the cage sinks to its lowest position. The drum having been disengaged the motor is then started, and the revolutions of the crank start the lifting motion of the pickling process. When the pickling is finished the rope drum is again thrown into gear and the lifting rope coils round the drum, the movable section of the track being once more raised to the height of the rails. The crab is then conveyed with the pickled material to the neighbouring vat or to the place where it is to be unloaded, the next cage, loaded with fresh material, coming to take the place of the one that has just left.





PATENT ELECTRIC PICKLING MACHINE FOR PICKLING SHEETS  
STABILIMENTO SILVESTRO NASTURZIO, SAMPIERDARENA

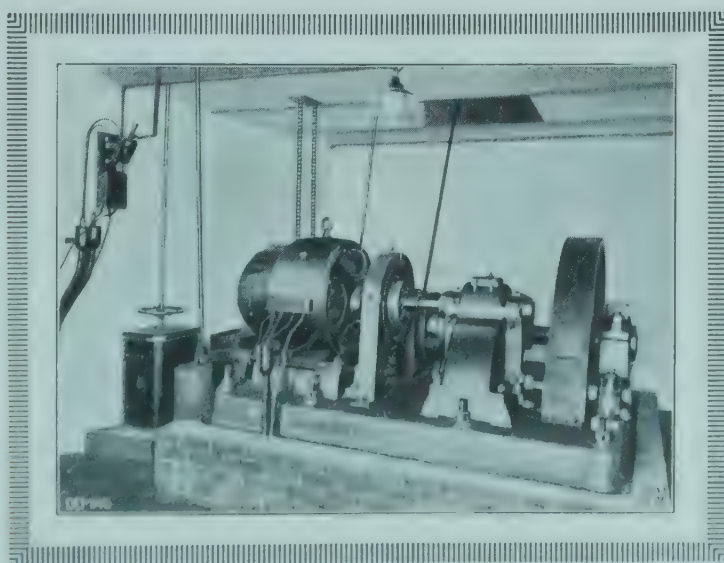
**T**he up and down movement in the pickling acid and in the flushing liquid and the lifting of the material out of the liquids, is done by one motor only, which has the load thrown off by means of counterweights. According as the pickling plant has one or two pickling vats and the flushing vat necessary, upwards of 150 000 kilos. of black pickling or up to 300 000 kilos. of white pickling can be done in a double shift. Pickling plants are used in tube works, gas cylinder works and shell factories, in rolling mills for gun barrels etc., enamelling works, galvanising and tinning shops brass and copper rolling mills.





PICKLING PLANT FOR SHEETS / DELIVERED FOR THE PLATE ROLLING MILL  
OF CAPITO & KLEIN, AKTIEN-GESELLSCHAFT, BENRATH nr. DÜSSELDORF

The illustration below shows the electric driving engine for  
the above plant. To protect it from the acid fumes  
it has been erected in a closed cellar.





# LIFTING MAGNET



# TRANSPORTING PLATE SCRAP





**F**or rolling tube strips, bridge material etc. the so-called universal rolling mills are employed. These differ from three-high plate rolling mills mainly in that they have vertical rolls as well as the horizontal ones, attached either before or behind or before and behind the horizontal rolls. The object of the vertical rolls is to bring the width of the material to definite dimensions. Thus the finished product from the universal rolling mill has definite dimensions both in thickness and in width, whereas the rolled material produced on a plate rolling mill, for want of a universal rolling mill, has first to be cut to width in order to get it to the desired dimensions. This naturally causes more waste. Universal rolling mills are made in standard sizes for widths from 100 to 1400 mm. As in the case of plate rolling mills the heavy kinds are constructed two-high, the lighter types being mostly three-high. The vertical rolls are driven from the spindle housings by a pinion specially arranged for this purpose, which is driven from the other pinions. So that the material may not be upset when passing between the horizontal and vertical rolls the latter must have a higher speed of rotation, for which the corresponding gear is provided in the pinions. We have constructed universal rolling mills very successfully for years, and have hitherto made more than 90 such rolling mills. In the construction of universal rolling mills we attached great value not only to the use of the very best material for the individual parts, but also to facility in dismantling all parts subject to ordinary wear and tear. Based on our long experience we now deliver universal rolling mills that are the height of perfection in this branch. Besides the rolling mills themselves we also deliver all the necessary appliances and auxiliary apparatus, such as roller gears, oscillating tables, uptakes, billet skids, hot banks straightening banks with electric and hydraulic drive etc., all based on the latest experience.

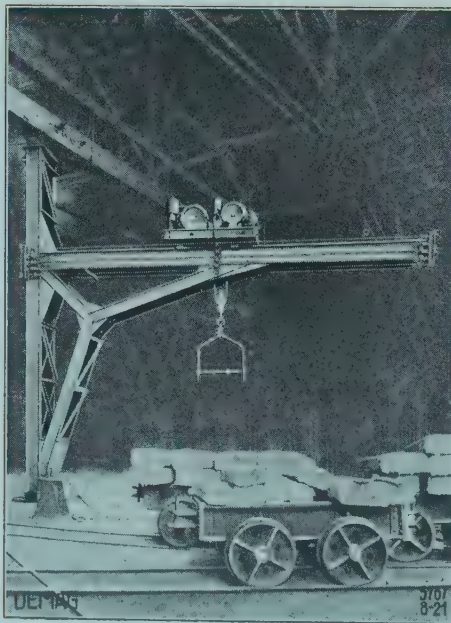




DEMAG

5754  
13e-59

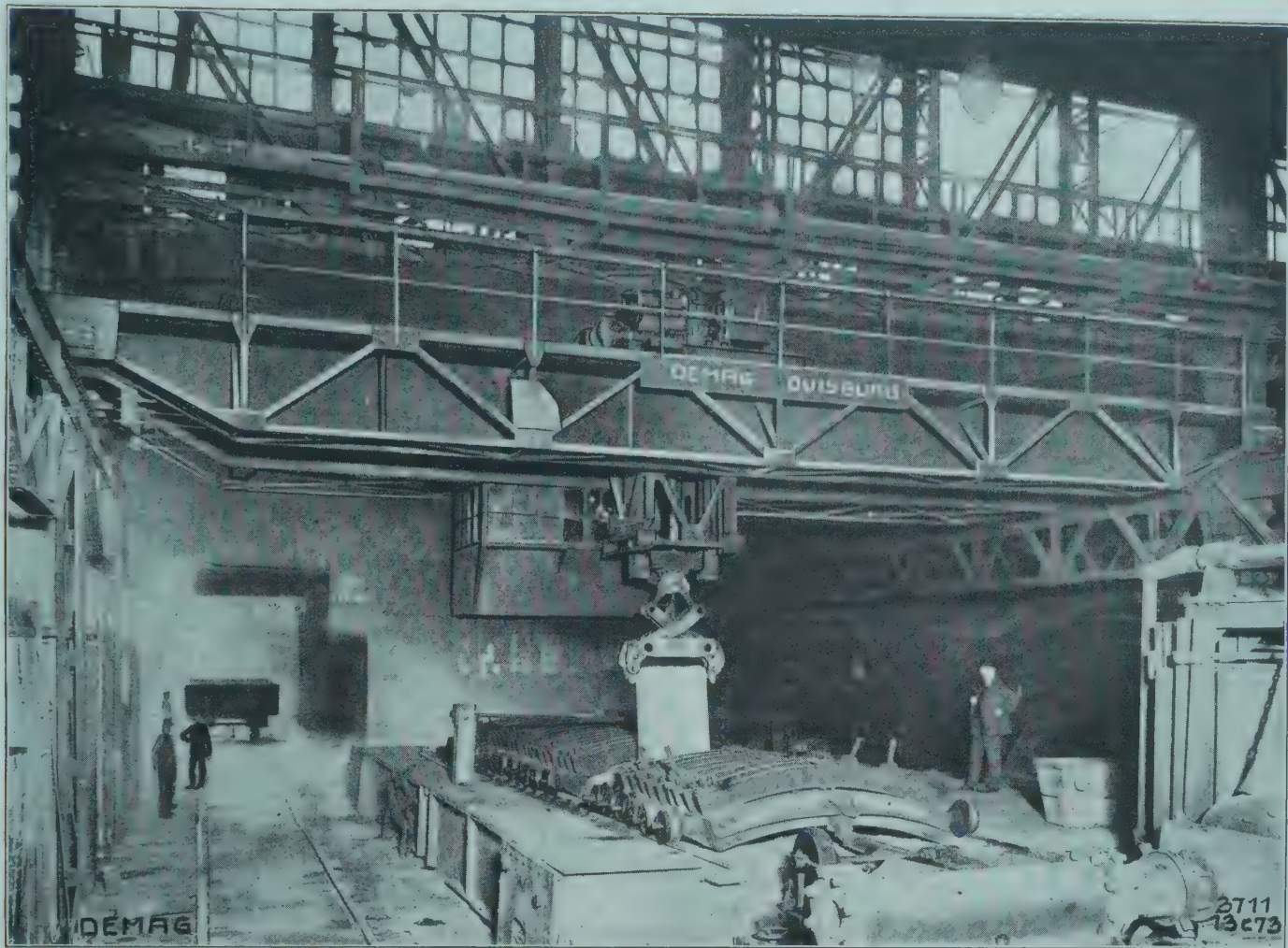
MAGNET CRANE FOR TRANSPORTING SLABS  
DELIVERED FOR THE SOCIÉTÉ ANONYME DE LA PROVIDENCE, HAUTMONT



Slewing crane with  
electric travelling  
and lifting gear

for serving a slabs  
reheating furnace  
in a rolling mill.





SLAB SOAKING PIT CRANE, LIFTING CAPACITY 15000 K. AND 14 m. SPAN  
DELIVERED FOR THE BISMARCKHÜTTE A.-G., BISMARCKHÜTTE (UP. SILES.)

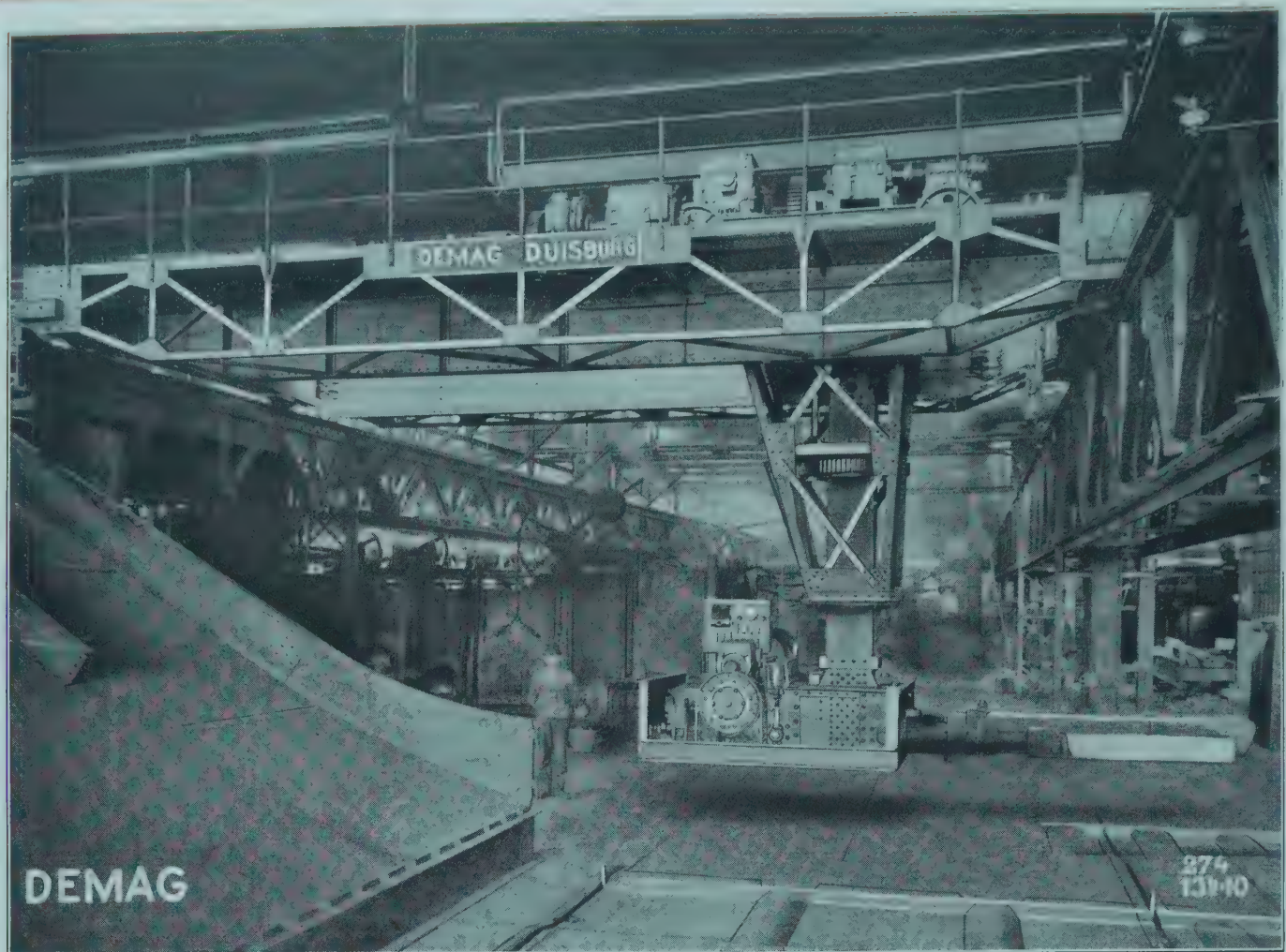
**T**he illustration below shows one of our standard crabs of which we have made large numbers for single and double rails for transporting both piece and bulk goods of all descriptions. They are to be specially recommended in cases where the material has to be brought up from great distances and conveyed round existing buildings.

Electric monorail  
crab without



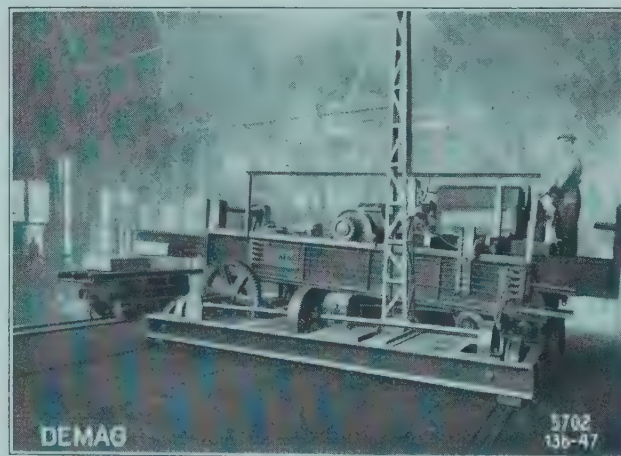
driver's stand,  
transporting slabs.





**ELECTRIC SLAB CHARGING CRANE WITH A LIFTING CAPACITY OF 5000 KIL.  
DELIV. FOR THE BISMARCKHÜTTE A.-G., BISMARCKHÜTTE (UPPER SILESIA)**

**Electric slab charging device with travelling bogie. Delivered for the Vereinigten  
Hüttenwerke Burbach-Eich-Düdelingen, Burbacher Hütte, Burbach.**

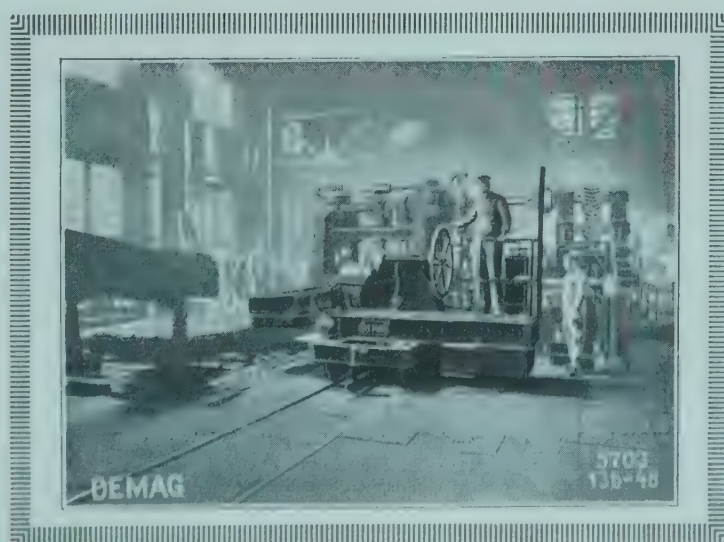






ELECTRIC SLAB CHARGING CRANE TO CARRY 2000 KILOS. AND WITH 20 m. SPAN. / DELIVERED FOR BALDWINS LTD., LANDORE

Electric slab truck with travelling bogie. Delivered for the Vereinigten Hüttenwerke Burbach-Eich-Düdelingen, Burbacher Hütte, Burbach.





## ELECTRIC INGOT CHARGING CRANE



TO CARRY 3500 KILOGRAMMES / DELIVERED TO HAHN-  
SCHE WERKE, AKT.-GES., GROSSENBAUM nr. DUISBURG

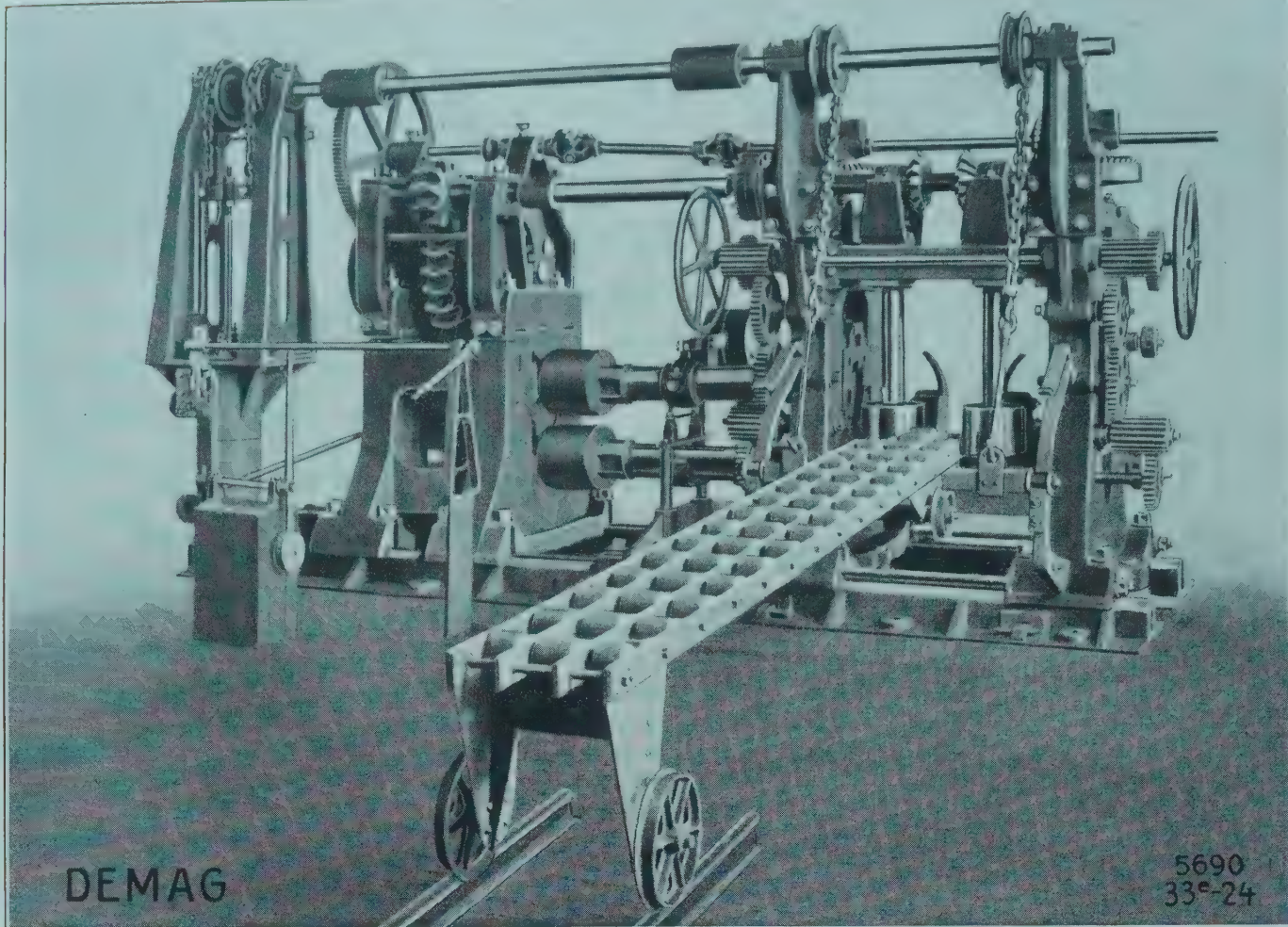


## ELECTRIC INGOT CHARGING CRANE



TO CARRY 5000 KILOS / DELIV. TO THE SHEET ROLLING  
MILLS OF SCHULZ-KNAUDT A.-G., ANGERORT nr. DUISB.

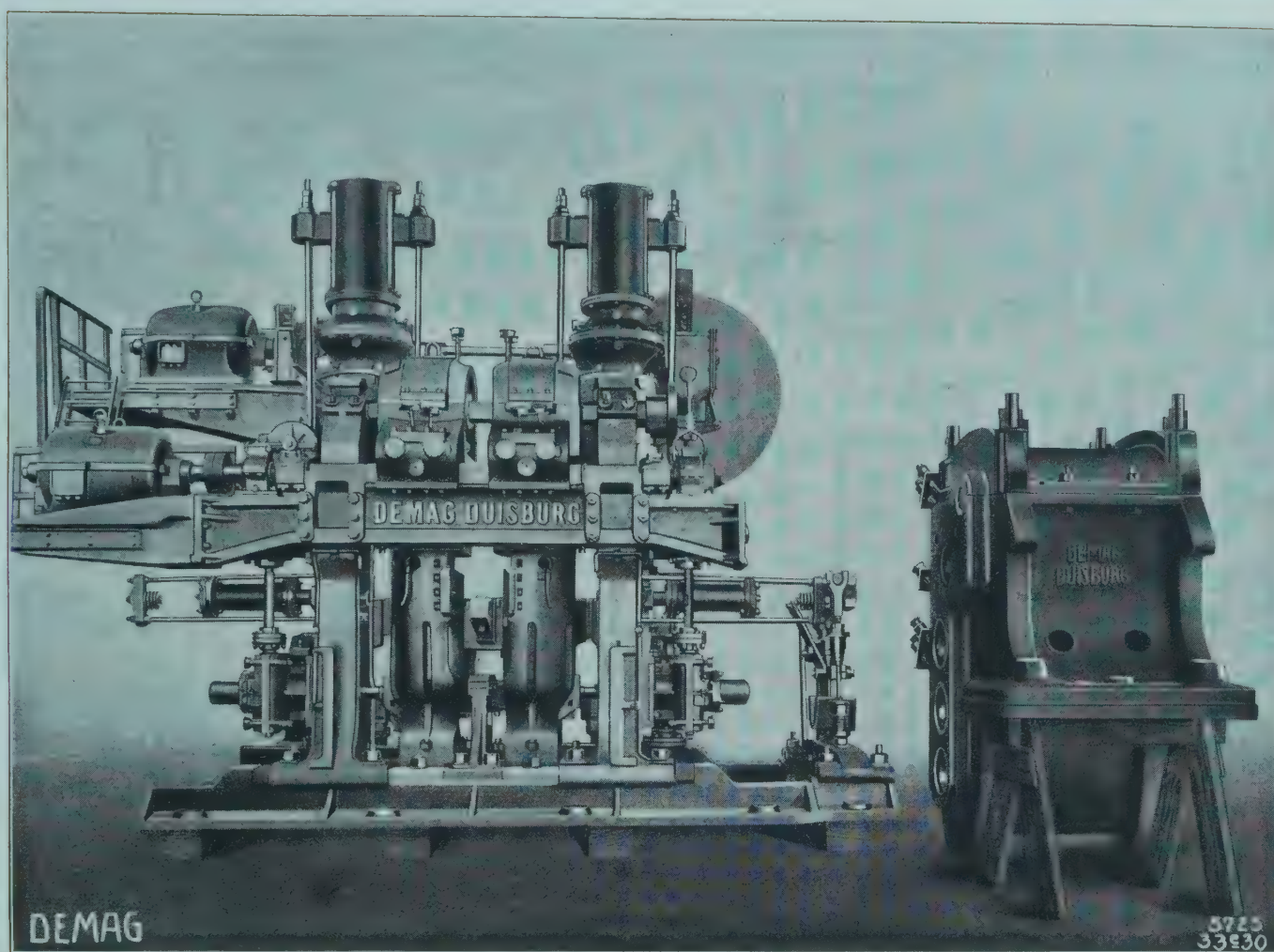




## ONE OF THE OLDEST UNIVERSAL ROLLING MILLS CONSTRUCTED BY US

**A** comparison of the above illustration and the one on the next page shows very clearly what a difference there is between the old-fashioned universal rolling mill and the one in use at the present day. In the older type the pinions are uncovered, whereas in more recent types they are entirely enclosed in cast mantles. In former times the vertical rolls were adjusted by hand and the top roll by gearing driven from the pinions. Now-a-days the adjustment of the top roll and the vertical rolls is electric, each by a separate motor. The oscillating tables were formerly raised and lowered, as may be seen in the illustration, by means of chains, which were tightened or slackened by rolls, by means of a gearing erected alongside the rolling mill. Of course the output of such a rolling mill was considerably lower than that of our modern universal rolling mills.

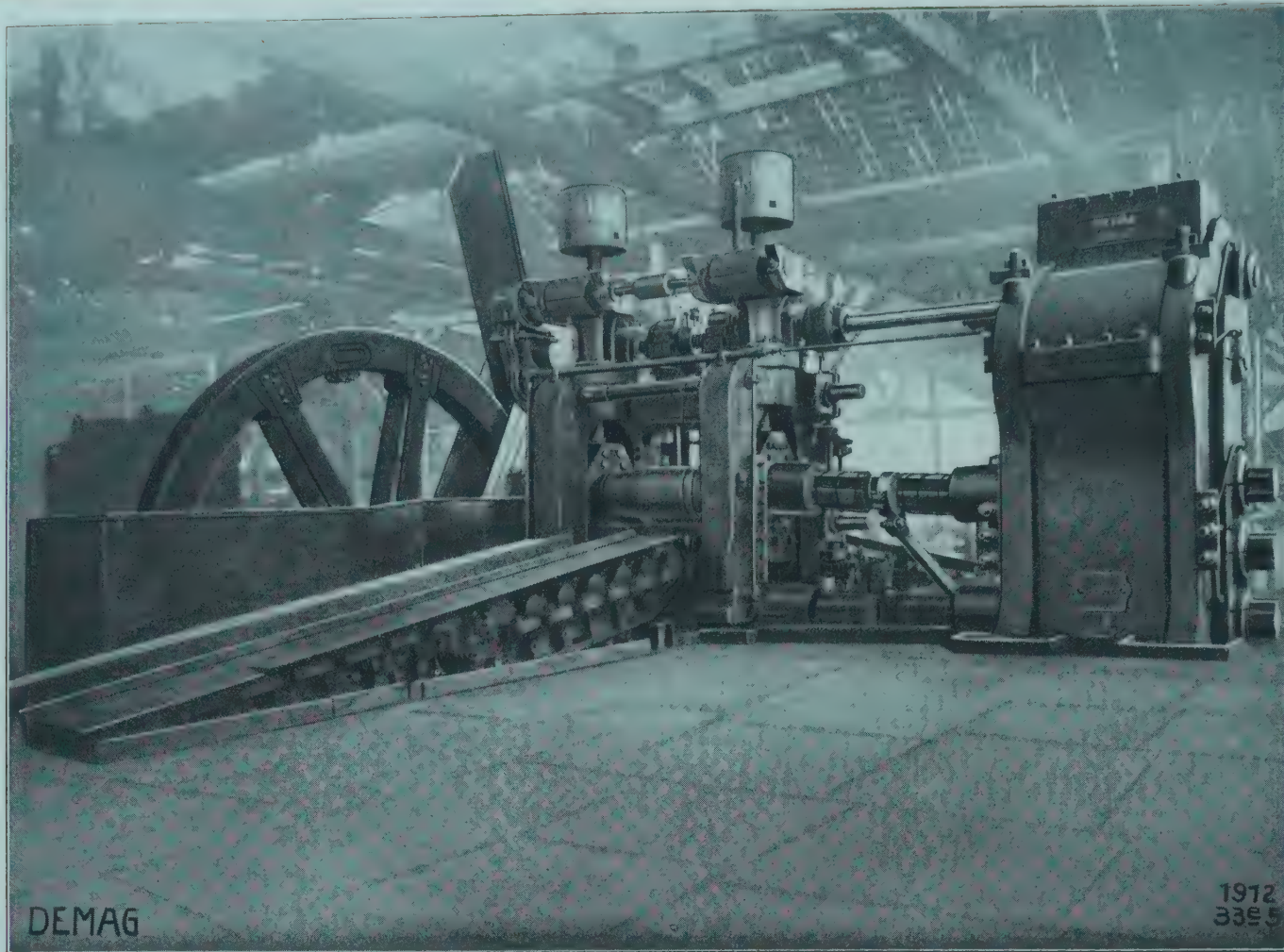




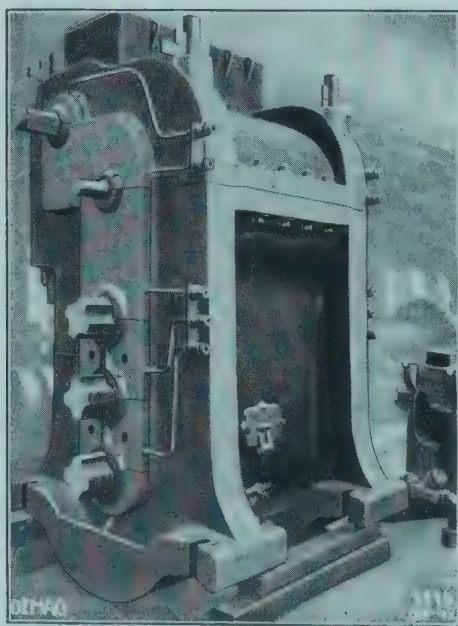
550 mm. THREE-HIGH UNIVERSAL ROLLING MILL / DELIV. FOR THE PHOENIX A.-G., DEP.: HOERDER VEREIN, HOERDE IN WESTF.

**T**he above universal rolling mill is one of the latest types. The adjustment and counter-balancing of the top roll are effected by electricity on our patent system. The middle roll is raised and lowered by hydraulic power; the cylinders for this purpose are erected on frames at the side of the housings. The gear for the adjustment of the vertical rolls is also electric. In order to secure a constant connection between the adjusting spindles at the side and the vertical system a hydraulic cylinder has been inserted between the spindles situated on both sides, which presses the vertical shafts against the adjusting spindles. As may be seen from the illustration the shell is in the same piece as the footstep bearing and the collar thrust bearing. Substantial construction, first-class material and ample and well-chosen lubricating devices are a guarantee that our universal rolling mills will run well.





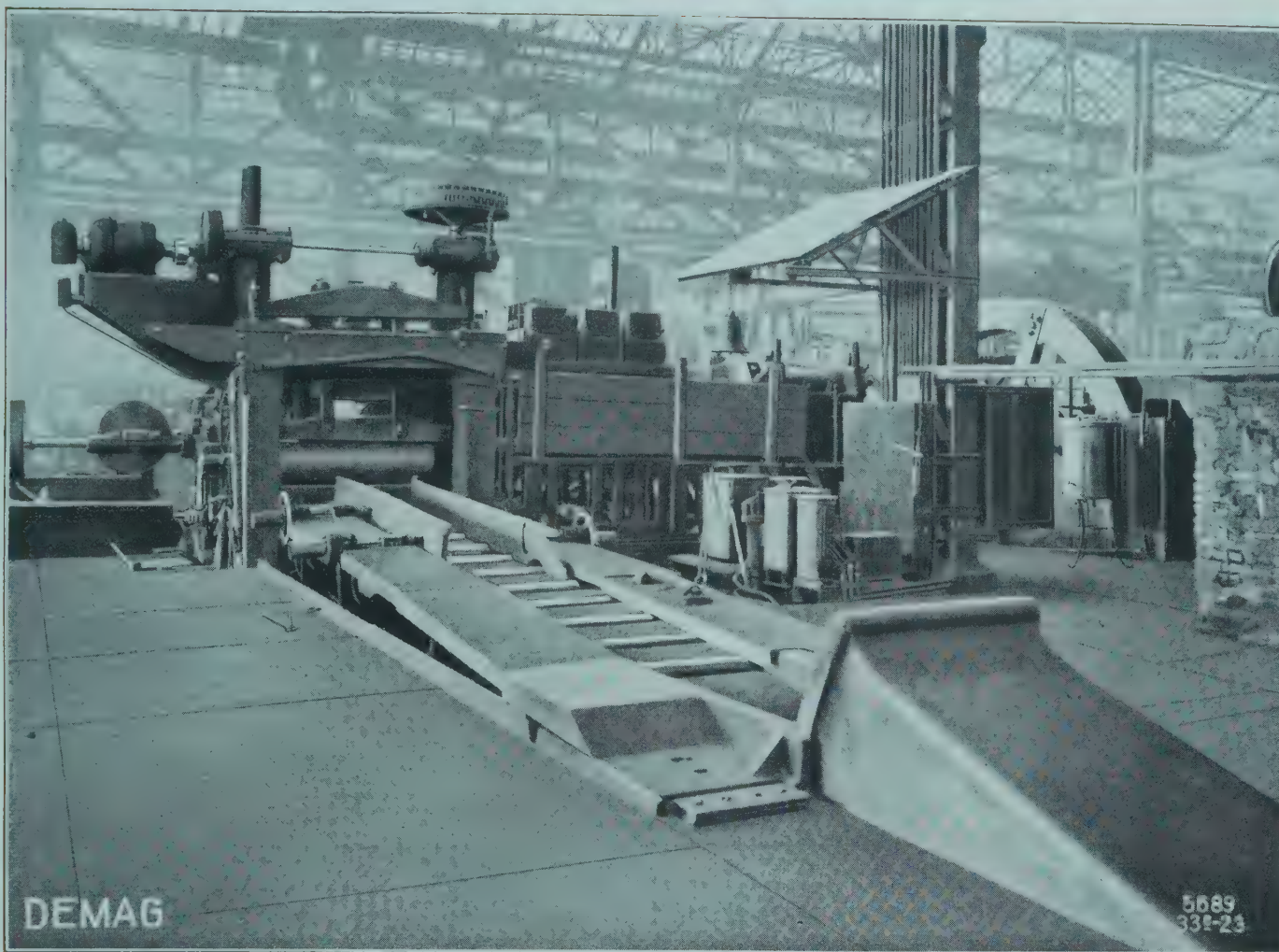
530 mm. THREE-HIGH UNIVERSAL ROLLING MILL  
DELIVERED FOR HENSCHEL & SOHN, DEPARTMENT:  
HENRICHSHÜTTE, HATTINGEN AN DER RUHR



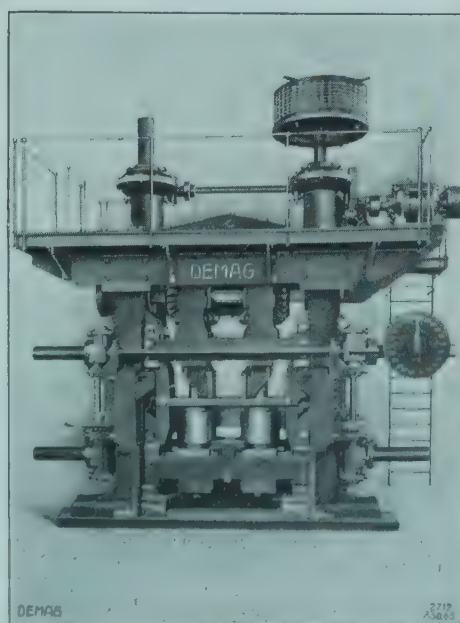
Spindle housings for  
the above mill.

Lubricated  
with calypsol.





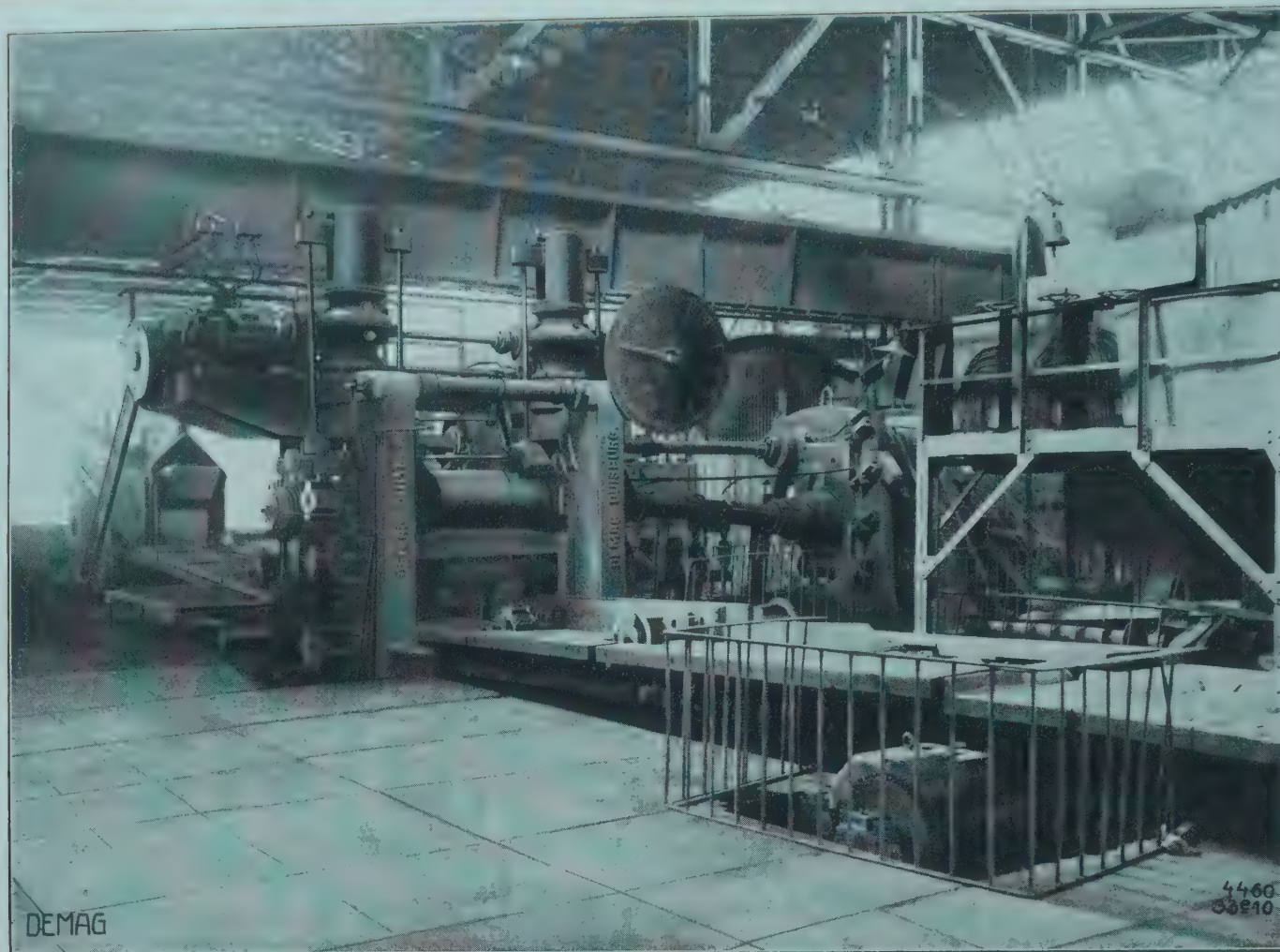
550 mm. THREE-HIGH UNIVERSAL ROLLING MILL / DELIV. FOR  
THE GELSENKIRCHENER BERGWERKS-AKTIENGESELLSCHAFT,  
DEPARTM.: AACHENER HÜTTENVEREIN AACHEN-ROTHE-ERDE



780 mm. three-high  
universal rolling  
mill for a width of

1150 mm. Aachener  
Hüttenverein,  
Aachen-Rothe-Erde.

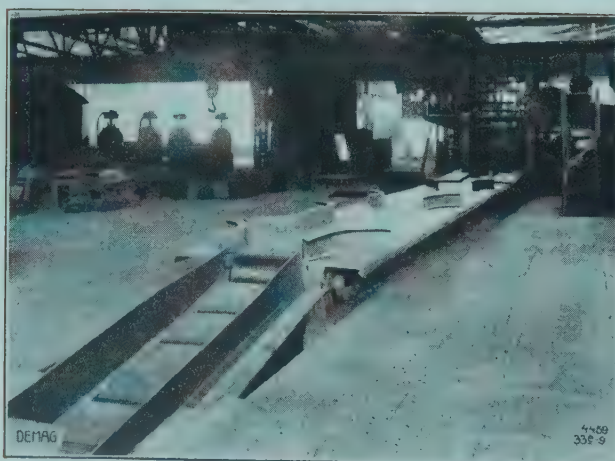




550 mm. THREE-HIGH UNIVERSAL ROLLING MILL FOR STRIPS UP TO A WIDTH OF 600 mm. (FRONT VIEW) / DEUTSCH-LUXEMBURG. BERGWERKS- UND HÜTTEN-A.-G., DEP.: DORTMUNDER UNION

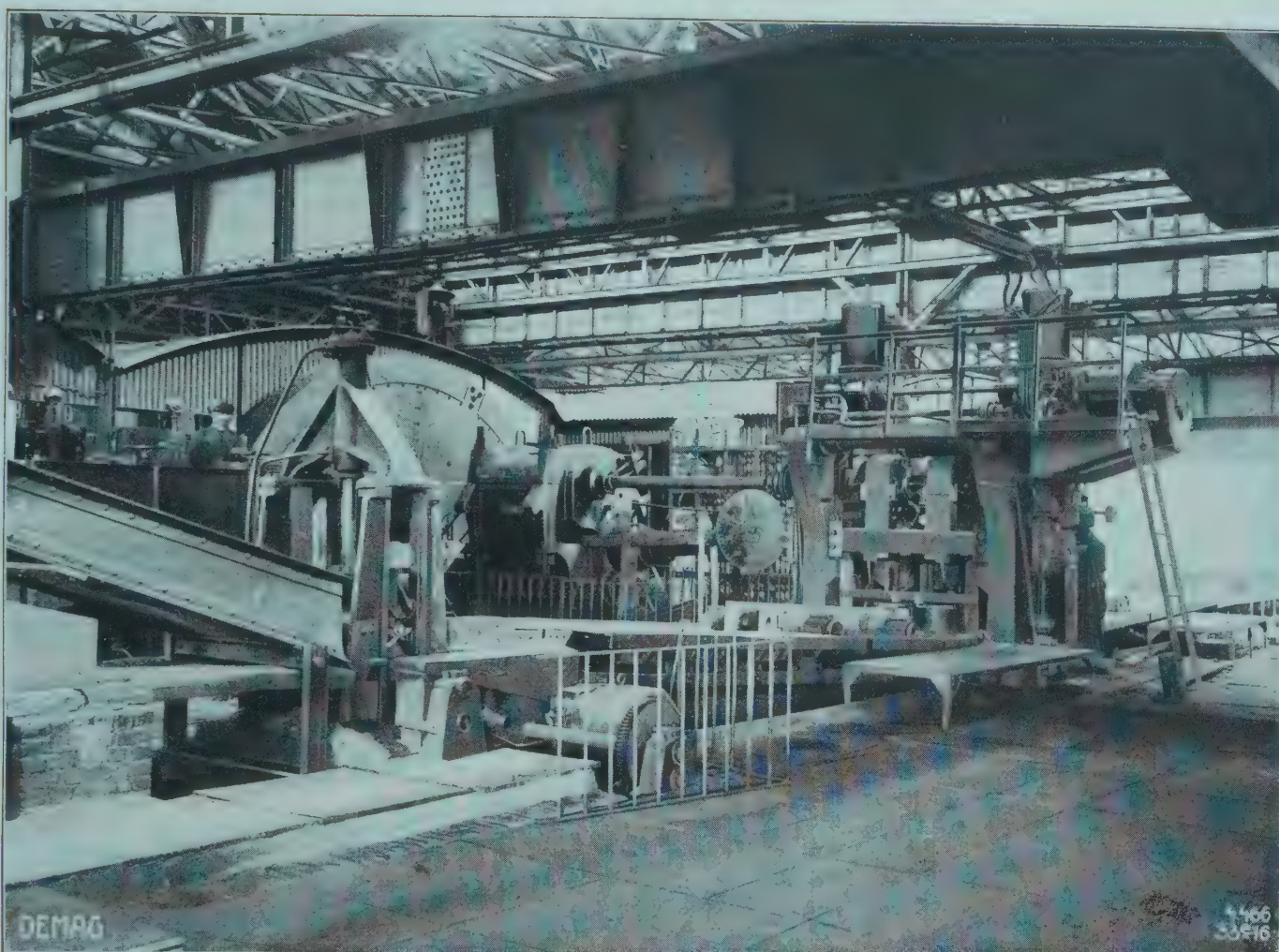
In this universal rolling mill the top roll is adjusted and counter-balanced by electricity on our patent system. The position of the vertical and horizontal rolls at any moment is shown by big disc indicators.

View of the feed roller gear with



deep level lip for the above mill.

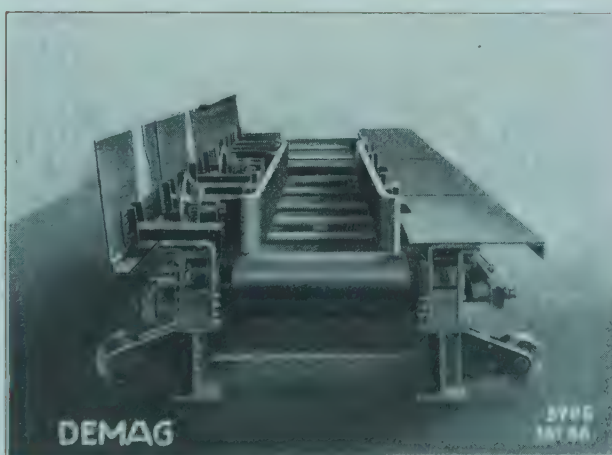




550 mm. THREE-HIGH UNIVERSAL ROLLING MILL (BACK VIEW)  
DELIVERED FOR THE DEUTSCH-LUXEMBURGISCHE BERGWERKS-  
UND HÜTTEN-A.-G., DEPT.: DORTMUNDER UNION, DORTMUND

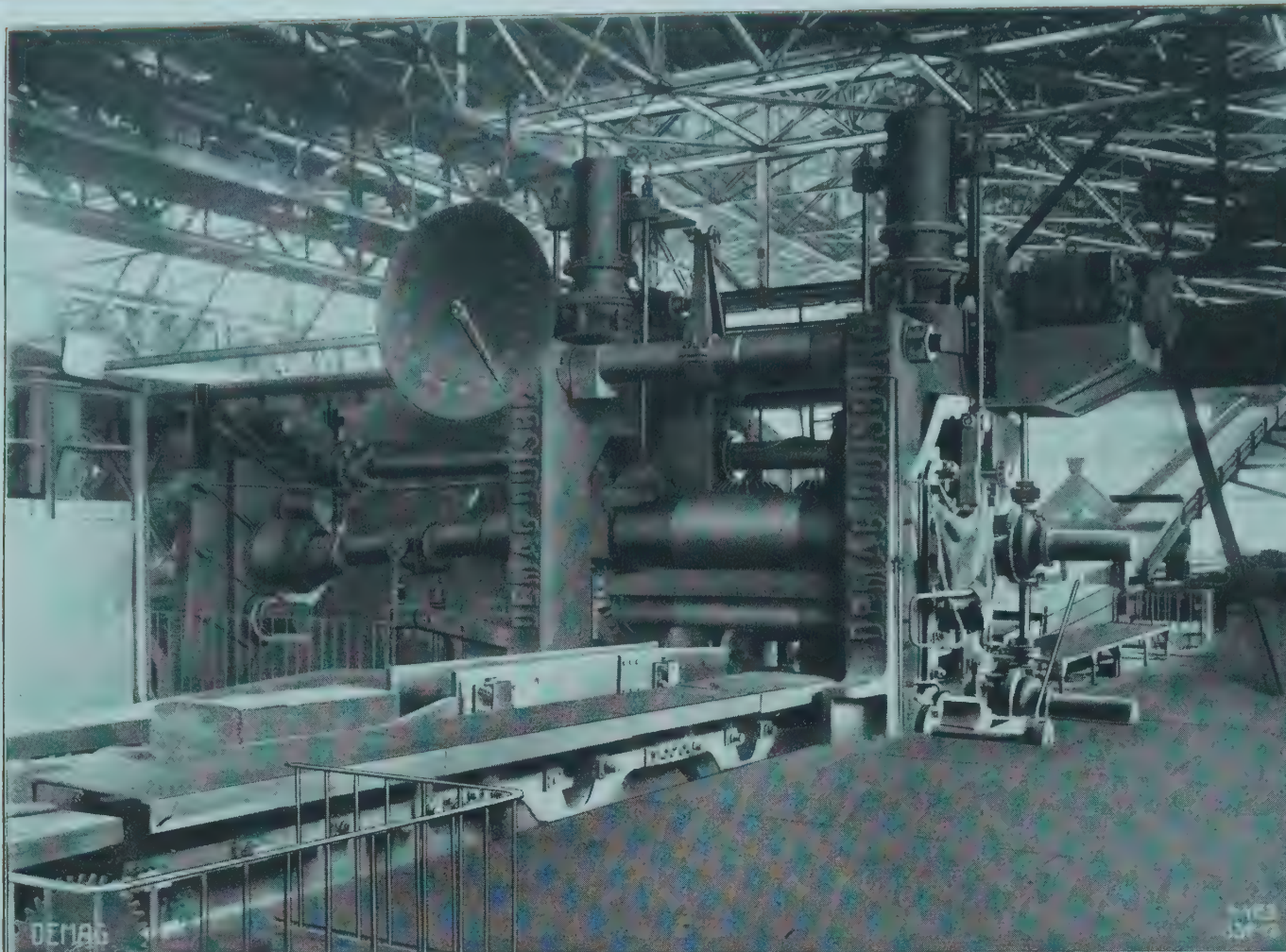
In the housings of this three-high universal rolling mill the middle roll is raised and lowered by hydraulic power, by means of a cylinder at the side of the housings. The mill is driven by electricity from a motor of about 1650 H.P.

Oscillating table  
for the above mill



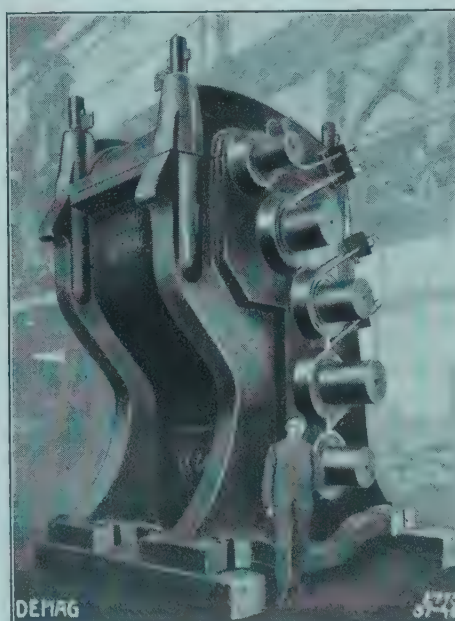
with guides to be  
adjusted by hand.





780 mm. THREE-HIGH UNIVERSAL MILL (FRONT VIEW) FOR STRIPS UP 1250 mm. IN WIDTH / DEUTSCH-LUXEMBURGISCHE BERGWERKS- UND HÜTTEN-A.-G., DORTMUNDER UNION, DORTMUND

Spindle housings for the above universal



The top roll is adjusted and counter-balanced by electricity. The

rolling mill. Lubricated with Calypsol.

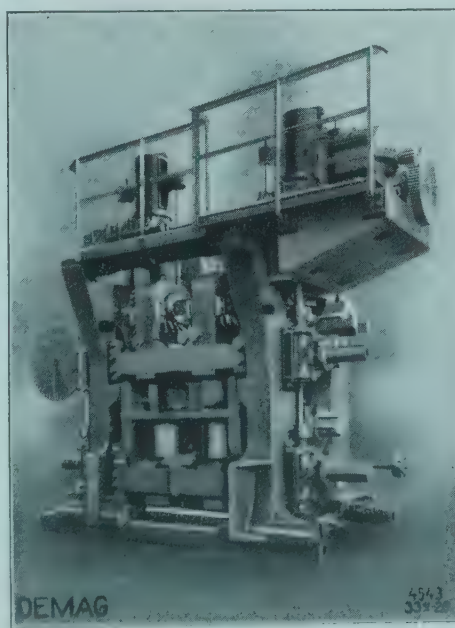
middle roll is raised and lowered by hydraulic power.





780 mm. THREE-HIGH UNIVERSAL MILL (BACK VIEW) / DELIVERED FOR THE DEUTSCH-LUXEMBURGISCHE BERGWERKS- U. HÜTTEN-AKT.-GES., DEPT.: DORTMUNDER UNION, DORTMUND

780 mm. three-high universal housings in the erecting

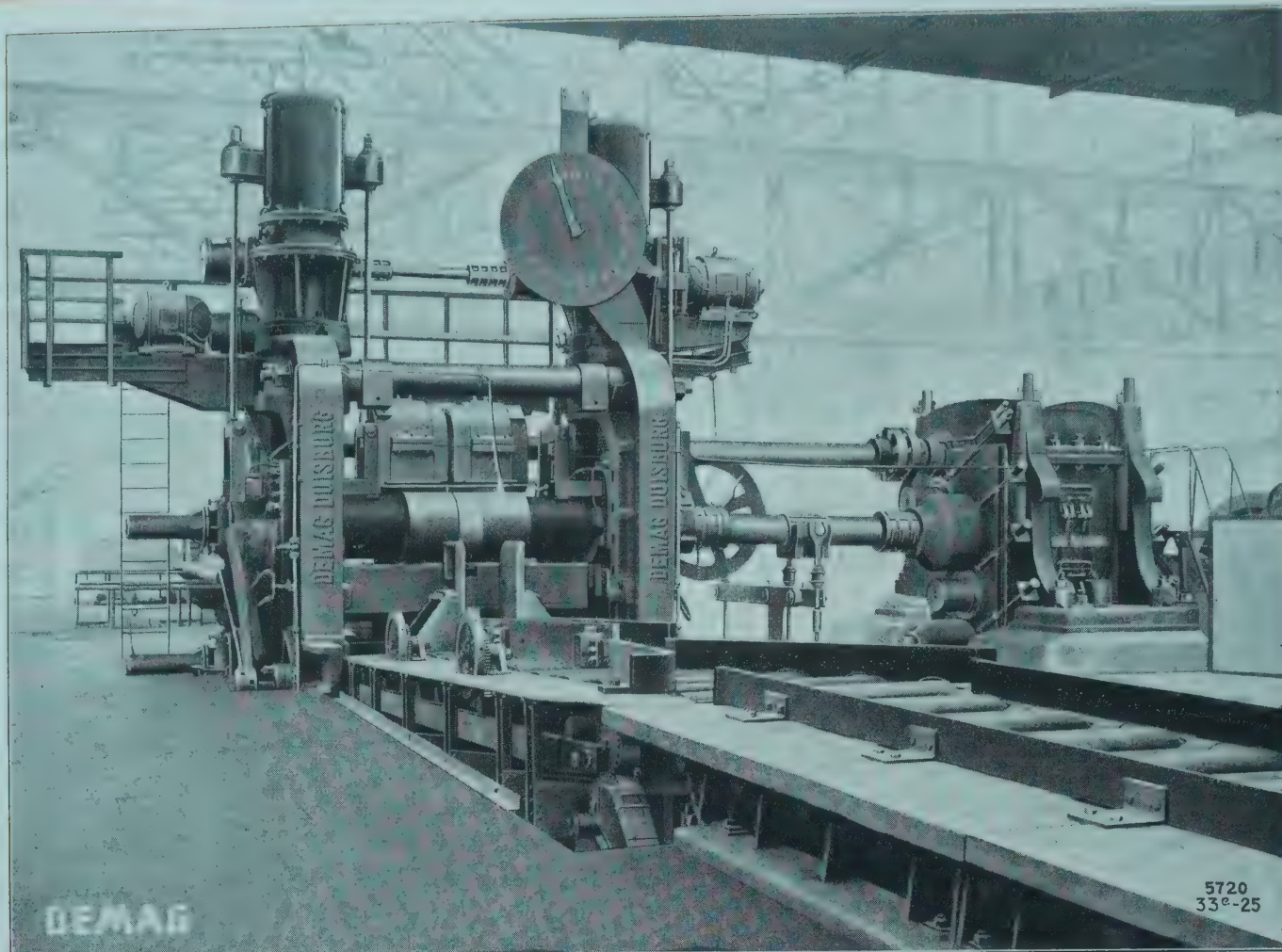


The mill is driven by a 3100 H.P. motor. The parts erected on the housings

shop. Delivered for the Dortmund Union.

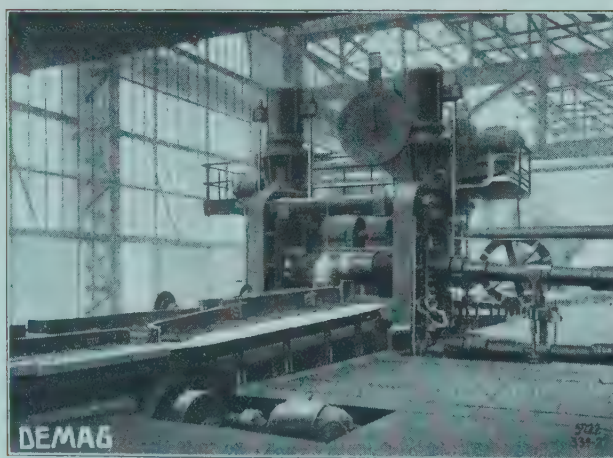
are easily accessible by means of an easily detachable platform.



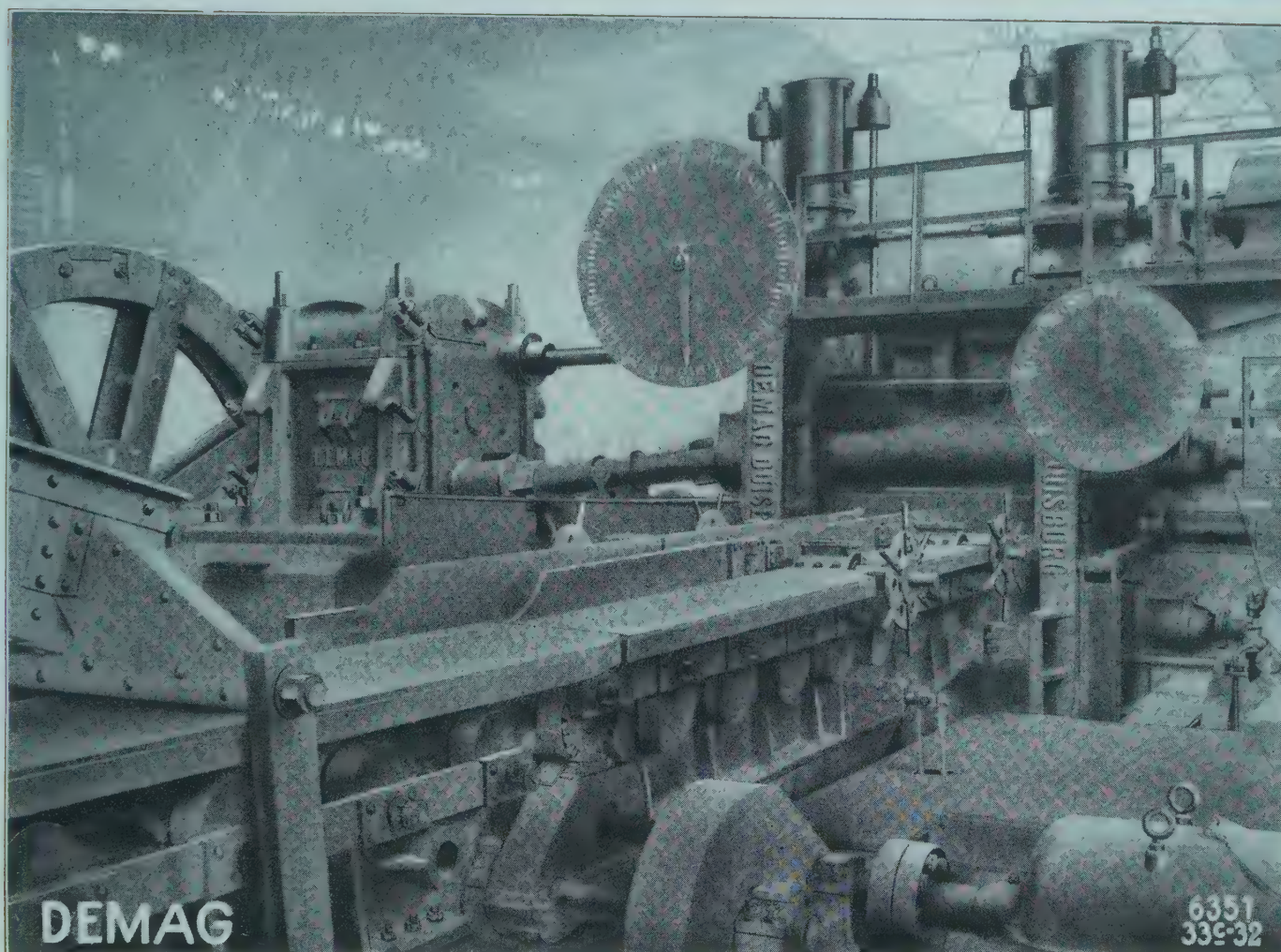


800 mm. THREE-HIGH UNIVERSAL ROLLING MILL FOR STRIPS / DELIVERED FOR THE VEREINIGTE HÜTTENWERKE BURBACH-EICH-DÜDELINGEN, DEPARTMENT: ESCHWEILER BERGWERKSVEREIN, ESCHWEILER

**T**he top roll is adjusted and counter-balanced by electricity, on our patent system. The middle roll is raised and lowered by the oscillating tables automatically on the Demag system. The upper illustration shows the mill with the formmost oscillating table lowered, the lower one with the same table raised.





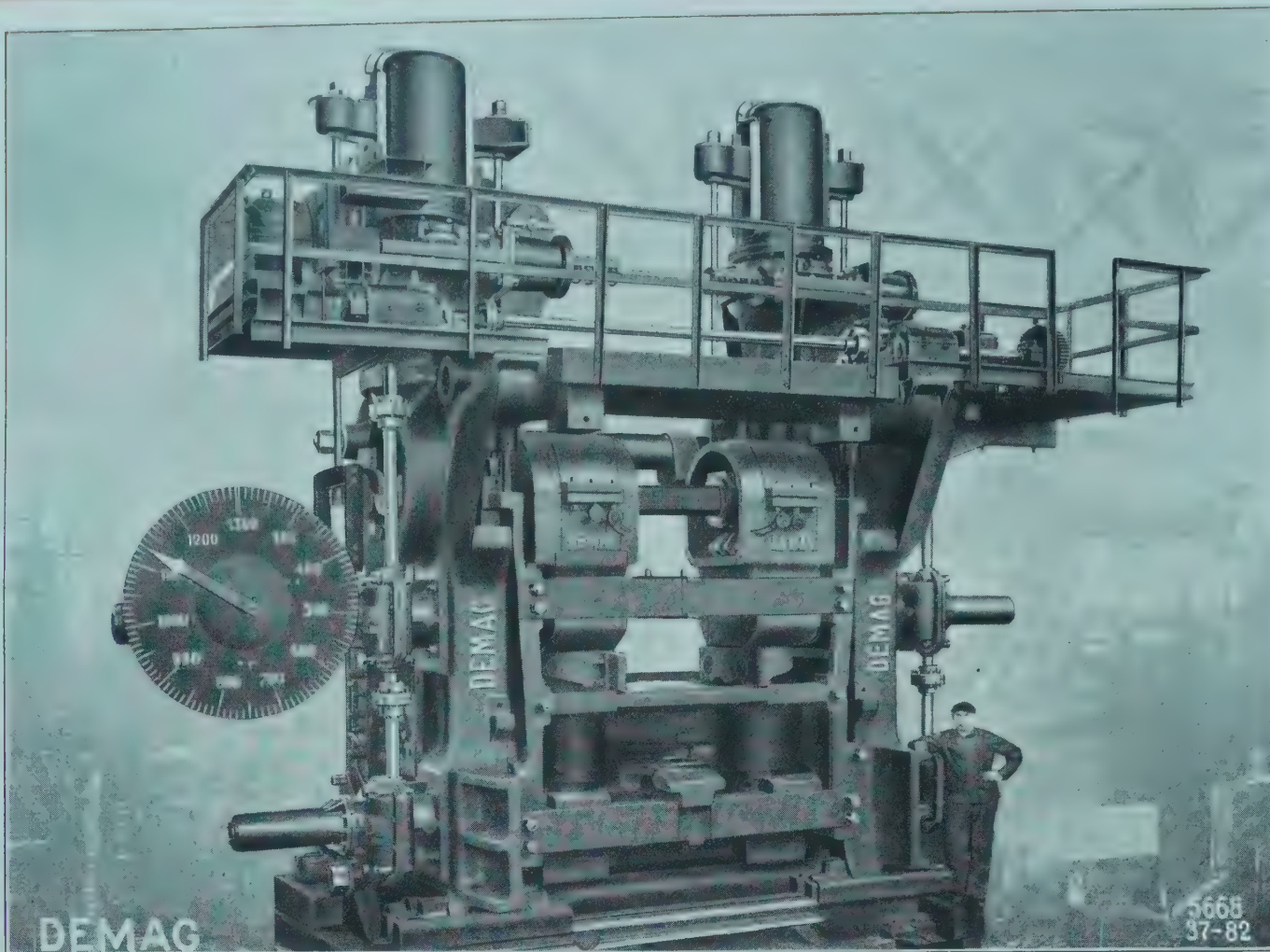


550 mm. THREE-HIGH UNIVERSAL ROLLING MILL FOR 600 mm. WIDTH, WITH LIFTING TABLE / DELIVERED TO THE "PHCENIX" A.-G. FÜR BERGBAU UND HÜTTENBETRIEB, DEPT.: HOERDER VEREIN, HOERDE IN WESTPHALIA

**B**ack view of the 800 mm. three-high universal mill shown on the previous page, for strips ranging from 200 to maximum 1300 mm. in width. The mill is so arranged as to enable plates up to 2800 mm. in width to be rolled on it after inserting plate rolls.



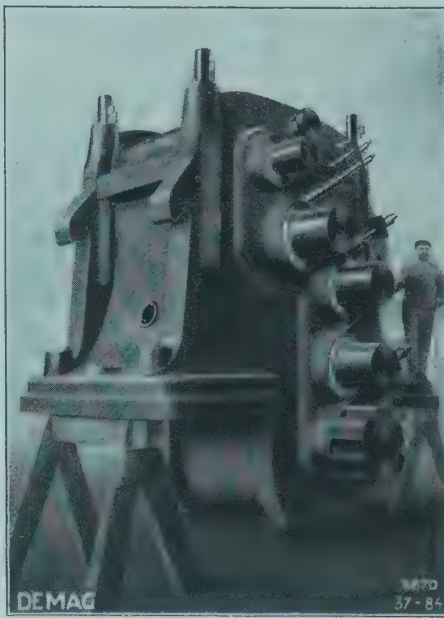




800 mm. THREE-HIGH UNIVERSAL HOUSINGS ERECT. IN THE WORKSHOP DELIVERED FOR THE VEREINIGTE HÜTTENWERKE BURBACH-EICH-DÜDELINGEN, DEPARTM.: ESCHWEILER BERGWERKSVEREIN, ESCHWEILER

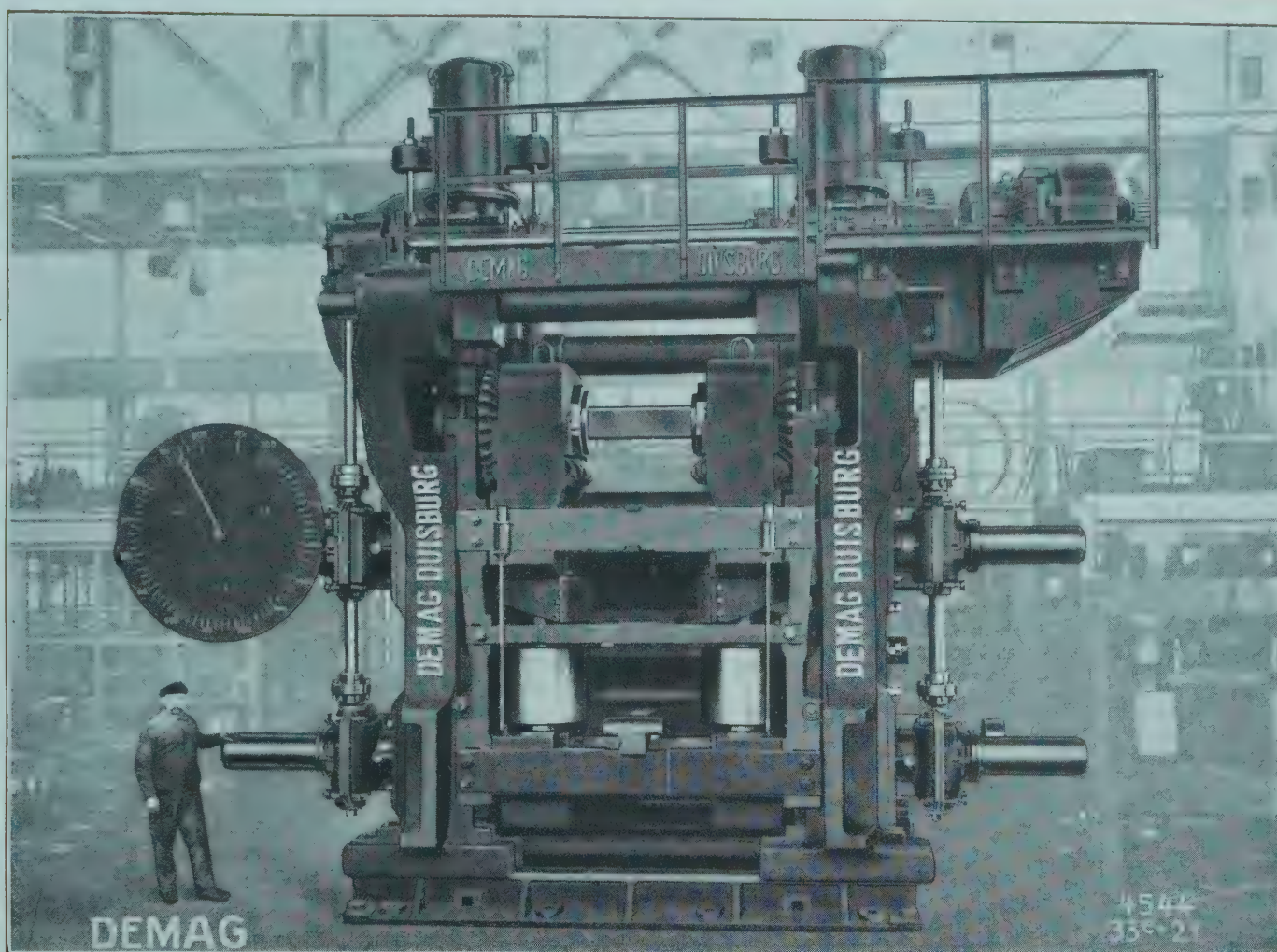
### THREE-HIGH SPINDLE HOUSINGS FOR THE ABOVE UNIVERSAL ROLL. MILL

The upper illustration shows very clearly the extremely substantial construction of our universal housings. The vertical system in the above type is so constructed as to enable it to be entirely removed, without much loss of time, with square shaft, bevel wheels collar and



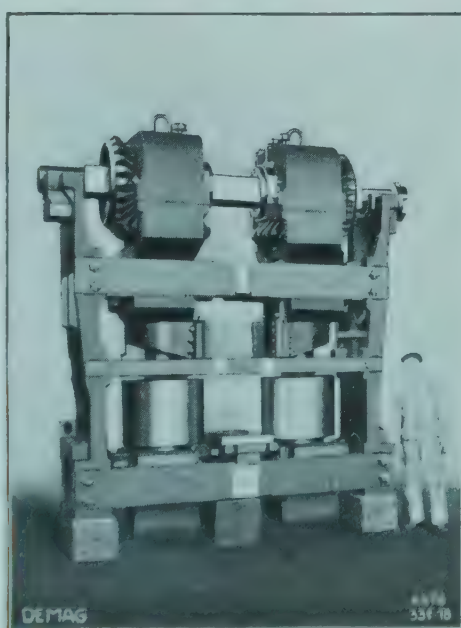
step bearings, with the vertical spindles and rolls, on loosening a few wedges and screws. The lower illustration shows the spindle housings for the above plant. The latter is not erected on base plates, but on the foundation. Calypsol is used for lubricating the spindle housings.



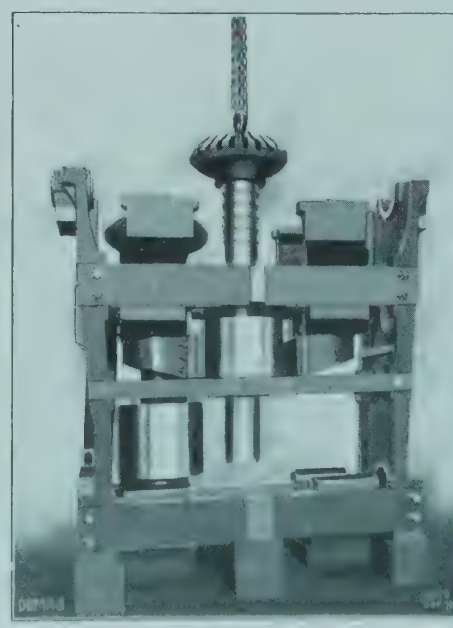


830 mm. UNIVERSAL THREE-HIGH HOUSINGS FOR ROLLING SLABS AND STRIPS UP TO 900 mm. IN WIDTH / DELIVERED FOR THE DILLINGER HÜTTENWERKE A.-G., DILLINGEN AN DER SAAR

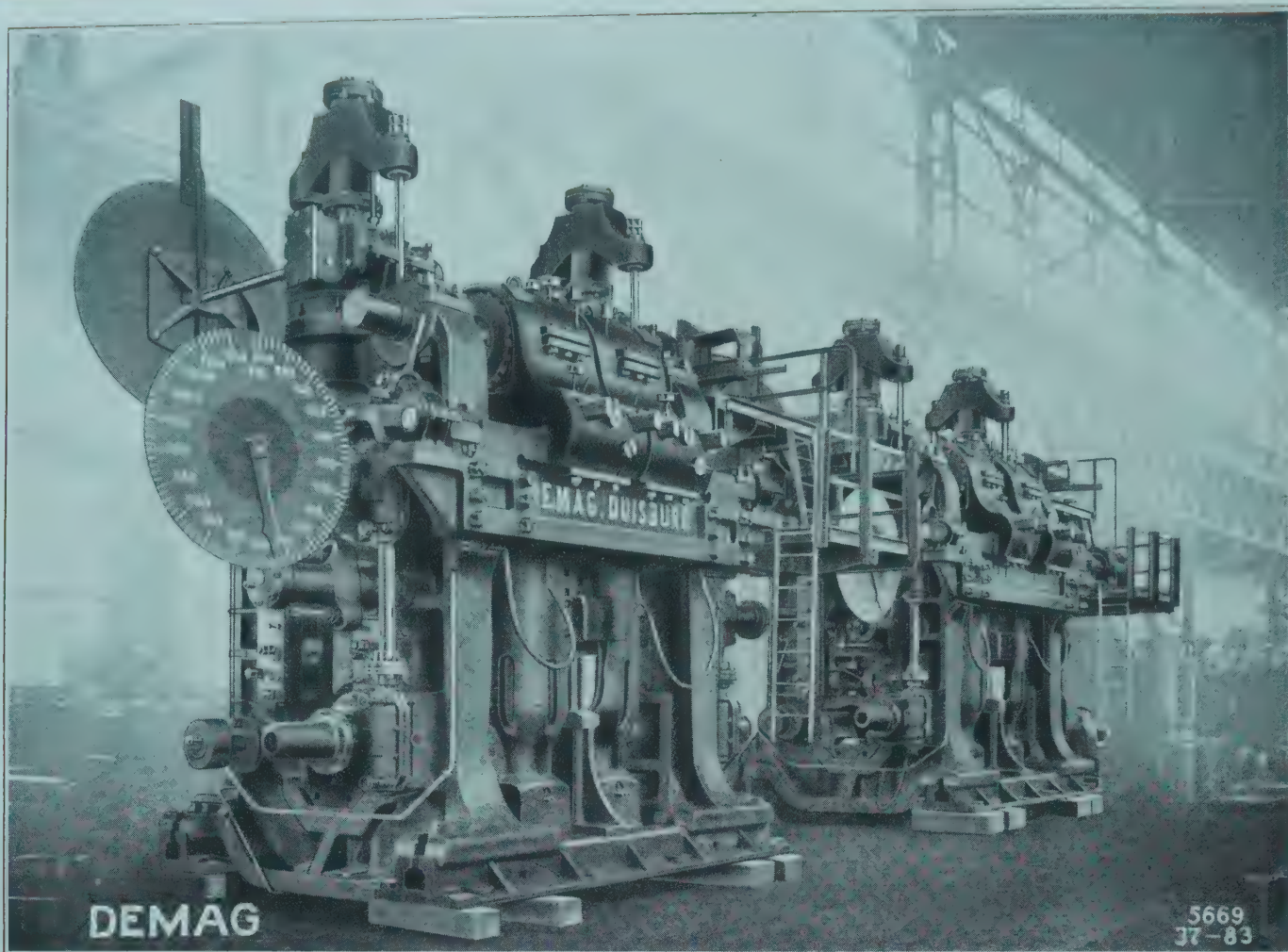
SPARE VERTICAL SYSTEM FOR THE ABOVE UNIVERSAL HOUSINGS



The illustration to the left shows the vertical system entirely removed, the one to the right the removal from the above-mentioned system of a vertical spindle with bevel wheel and roll.



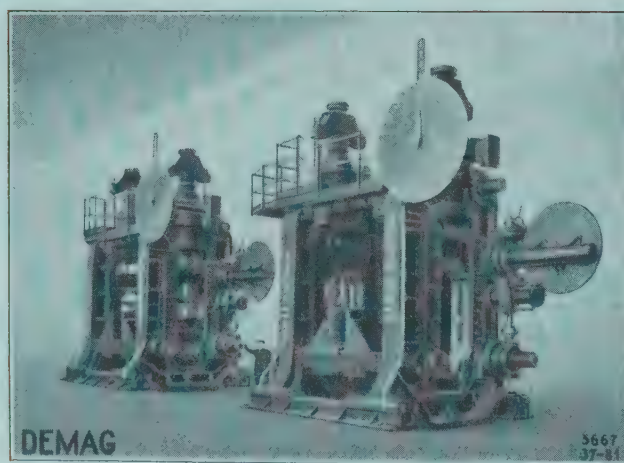




650 mm. and 780 mm. UNIVERSAL THREE-HIGH HOUSINGS FOR MAXIMUM ROLL WIDTHS OF 800 TO 1150 mm., IN THE ERECTING SHOP (BACK VIEW) GELSENK. BERGW.-A.-G., DEPT.: AACH. HÜTTENVER., AACH.-ROTHERDE

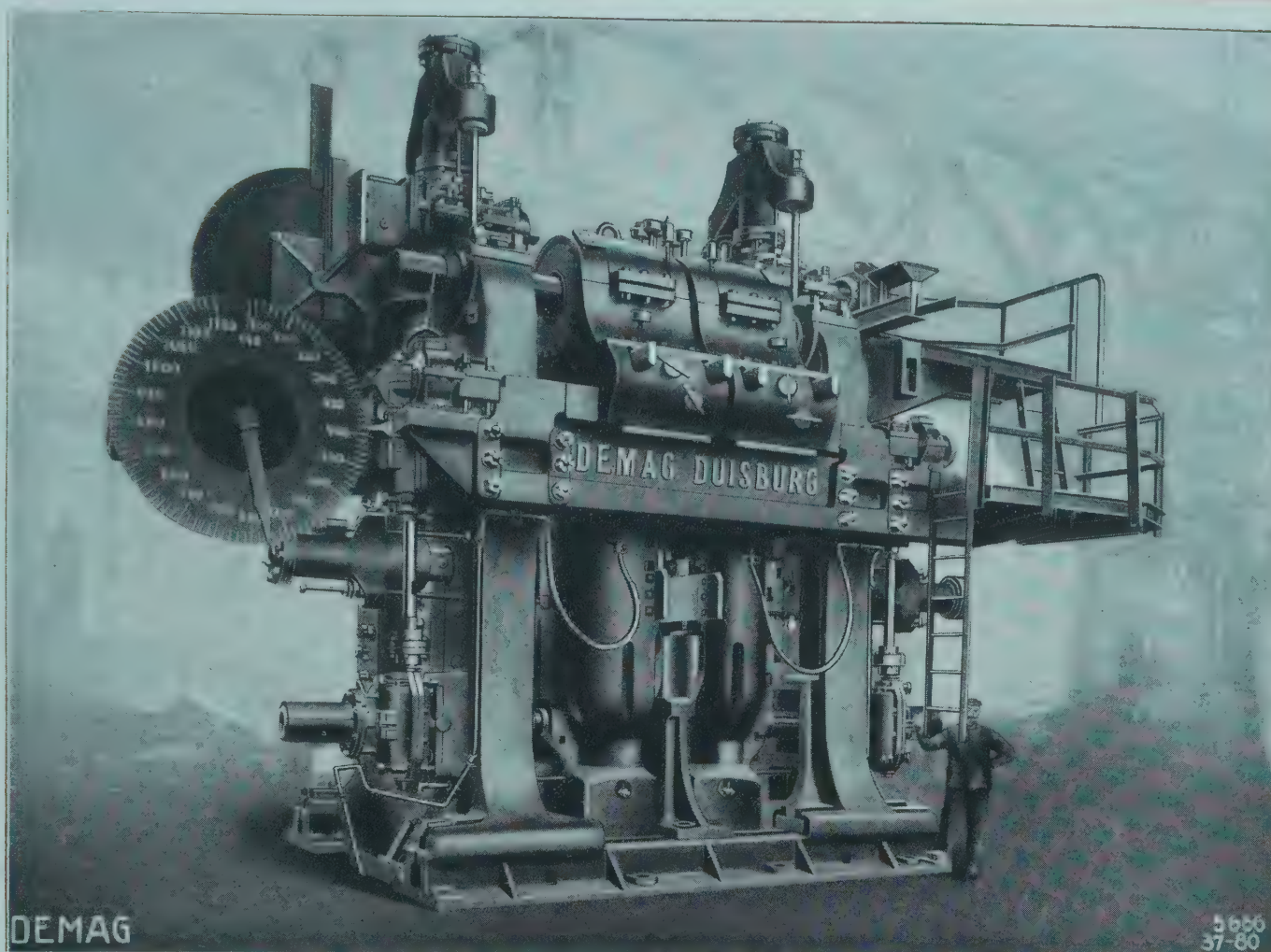
## FRONT VIEW OF THE ABOVE UNIVERSAL HOUSINGS

The casing for the vertical spindle and the foot and collar thrust bearings are all in one piece. Each vertical spindle-



le can be removed separately with the roll after removing the square shaft and loosening two wedges.





780 mm. THREE-HIGH UNIVERSAL HOUSINGS / DELIVERED FOR THE GELSENKIRCHENER BERGWERKS- UND HÜTTEN-AKTIEN-GESELLSCHAFT, DEPARTMENT: AACHENER HÜTTENVEREIN, AACHEN-ROTHE-ERDE

## UNIVERSAL ROLLING MILL FOR THE PHCENIX A.-G., HOERDER VEREIN

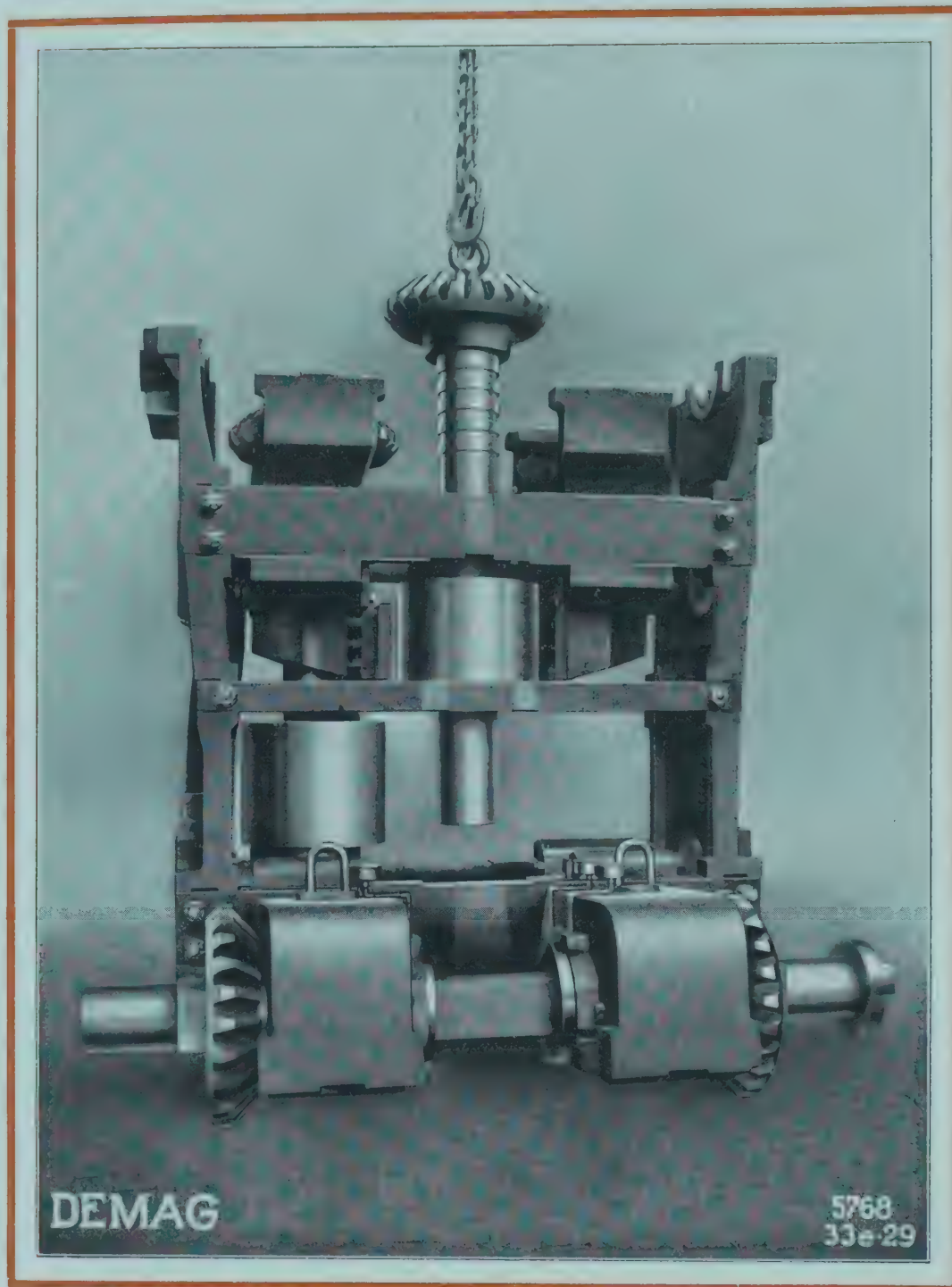
Top roll adjusted and counter-balanced on our patent system. The middle roll raised and



lowered automatically by the lifting table on the Demag system.



## VERTICAL SYSTEM TAKEN OUT



## OF A UNIVERSAL HOUSINGS



## THE FINISHING PROCESS IN THE UNIVERSAL IRON ROLLING MILL

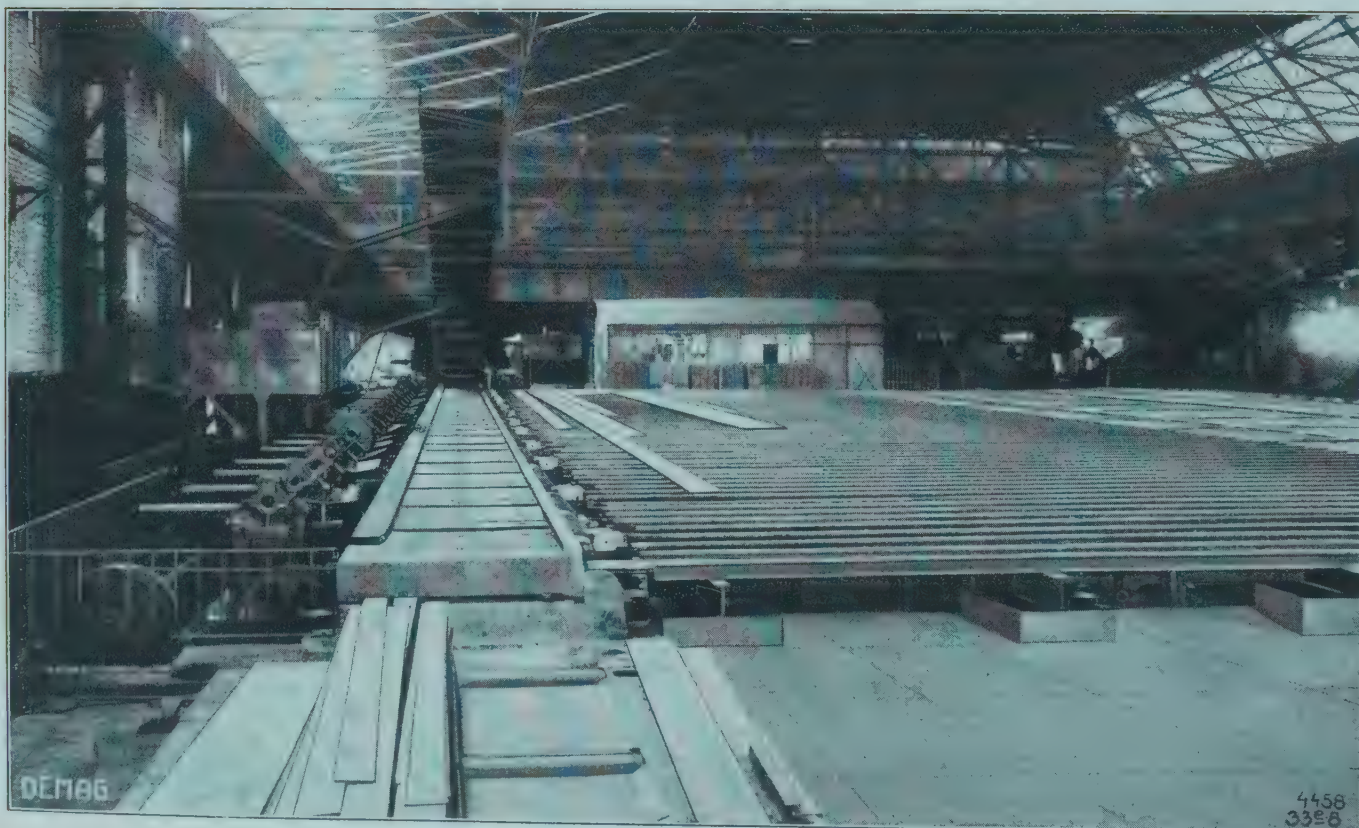
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**W**hen the universal iron has been rolled to the prescribed thickness it is pushed onto the straightening bank by suitable skids – sheet bar skids – and there straightened whilst red-hot. The straightening bank itself consists in the main of planed cast-iron plates, on which straight-edges are pushed against the universal iron by electric or hydraulic power. In this way the rolled material is straightened in the length. After the straightening process the universal iron is lifted off the straightening bank by means of lifting devices erected parallel to the straightening bank and worked by electricity or by hydraulic power, and laid on the grate of the hot bank, from where the skids transport it to the roller gear of the shearing machine. The roller gear of the shearing machine takes the strips to the shearing machine, where they are cut to the required length. By means of a roller gear behind the shearing machine the universal iron is then conveyed to the cooling bed from where it is loaded. If the universal iron has undulations it is taken to a straightening machine where they are removed. In the following illustrations we show a few of the many auxiliary machines for universal rolling mills made by us for firms at home and abroad.





ELECTRIC STRAIGHTENING BANK, LIFTING DEVICE AND HOT BANK  
FOR THE 550 mm. AND 780 mm. UNIVERSAL ROLLING MILLS  
DEUTSCH-LUXEMBURGISCHE BERGWERKS- UND HÜTTEN-AKTIE-  
GESELLSCHAFT, DEPARTMENT: DORTMUNDER UNION, DORTMUND



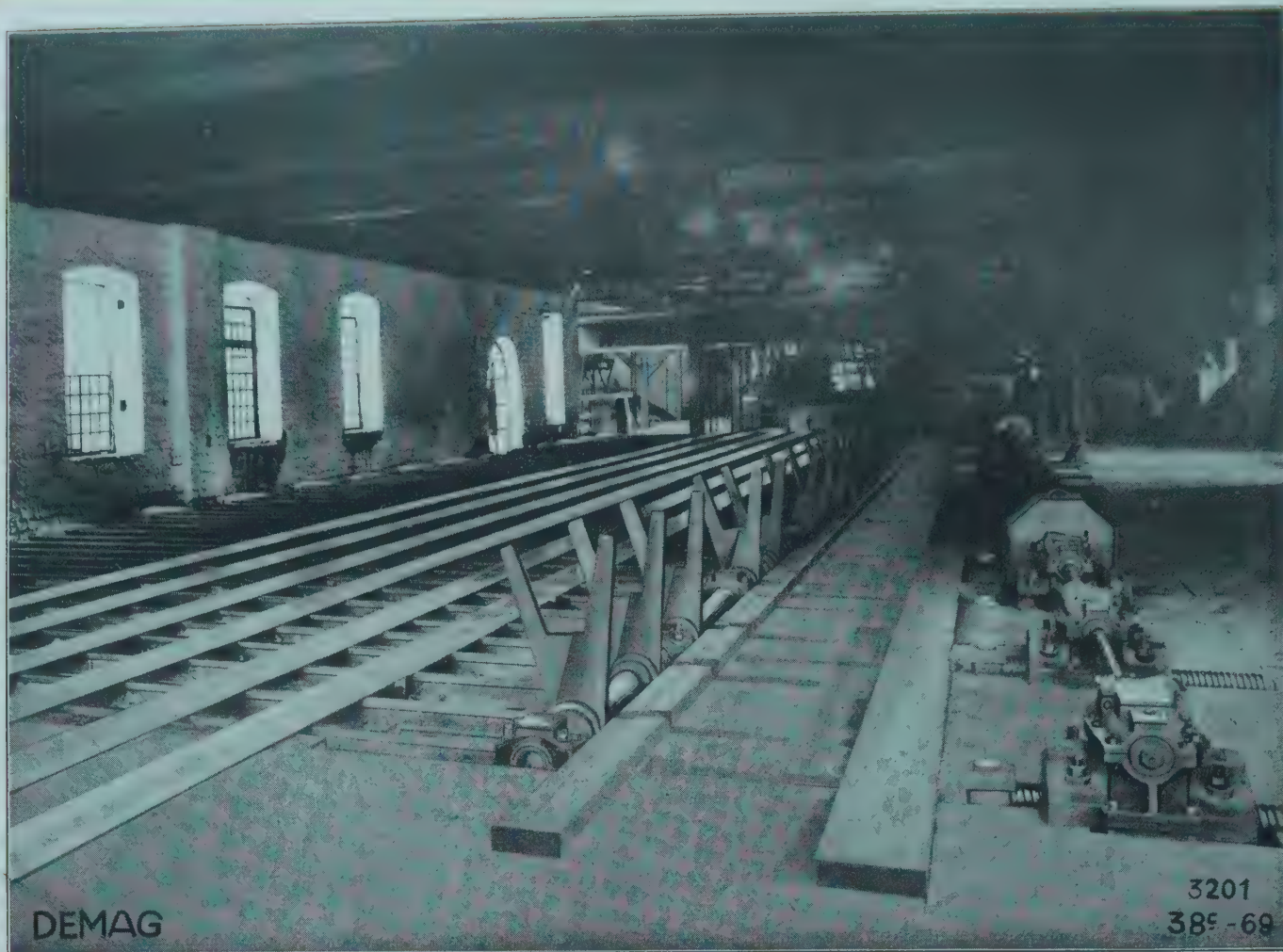




SHEET BAR SKID, HIGH LEVEL UPTAKE AND ELECTRIC STRAIGHTENING BANK WITH LIFTING DEVICE FOR THE 780 mm. UNIVERSAL ROLLING MILL  
DEUTSCH-LUXEMBURGISCHE BERGWERKS- UND HÜTTEN-AKTIEN-GESELLSCHAFT, DEPARTMENT: DORTMUNDER UNION, DORTMUND



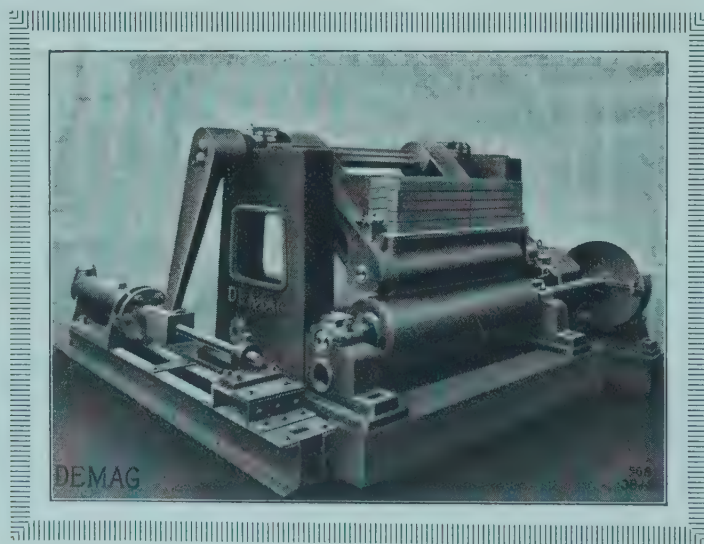




**HOT BANK FOR UNIVERSAL IRON WITH LIFTING DEVICE AND  
STRAIGHTENING BANK / DELIVERED FOR THE RÜMELINGER UND  
ST. INGBERTER HOCHÖFEN UND STAHLWERKE A.-G., ST. INGBERT**

### **LOW LEVEL SHEET BAR SKID / LARGE NUMBERS MADE**

The lower roll is driven by electricity, the upper one being raised and lowered by hydraulic power. The friction necessary for the conveying is attained by weights.







HOT BANK FOR UNIVERSAL IRON WITH LIFTING DEVICE AND STRAIGHTENING BANK / DELIVERED FOR THE RÜMELINGER UND ST. INGBERTER HOCHÖFEN UND STAHLWERKE A.-G., ST. INGBERT

## SINGLE STANDARD

The bottom roll is driven by electricity, the top one by hydraulic power. These one-sided skids are mostly built into straightening



## SHEET BAR SKID

banks. The lift is made large so that the strip to be lifted out of the straightening bank does not knock against the top roll of the skid.



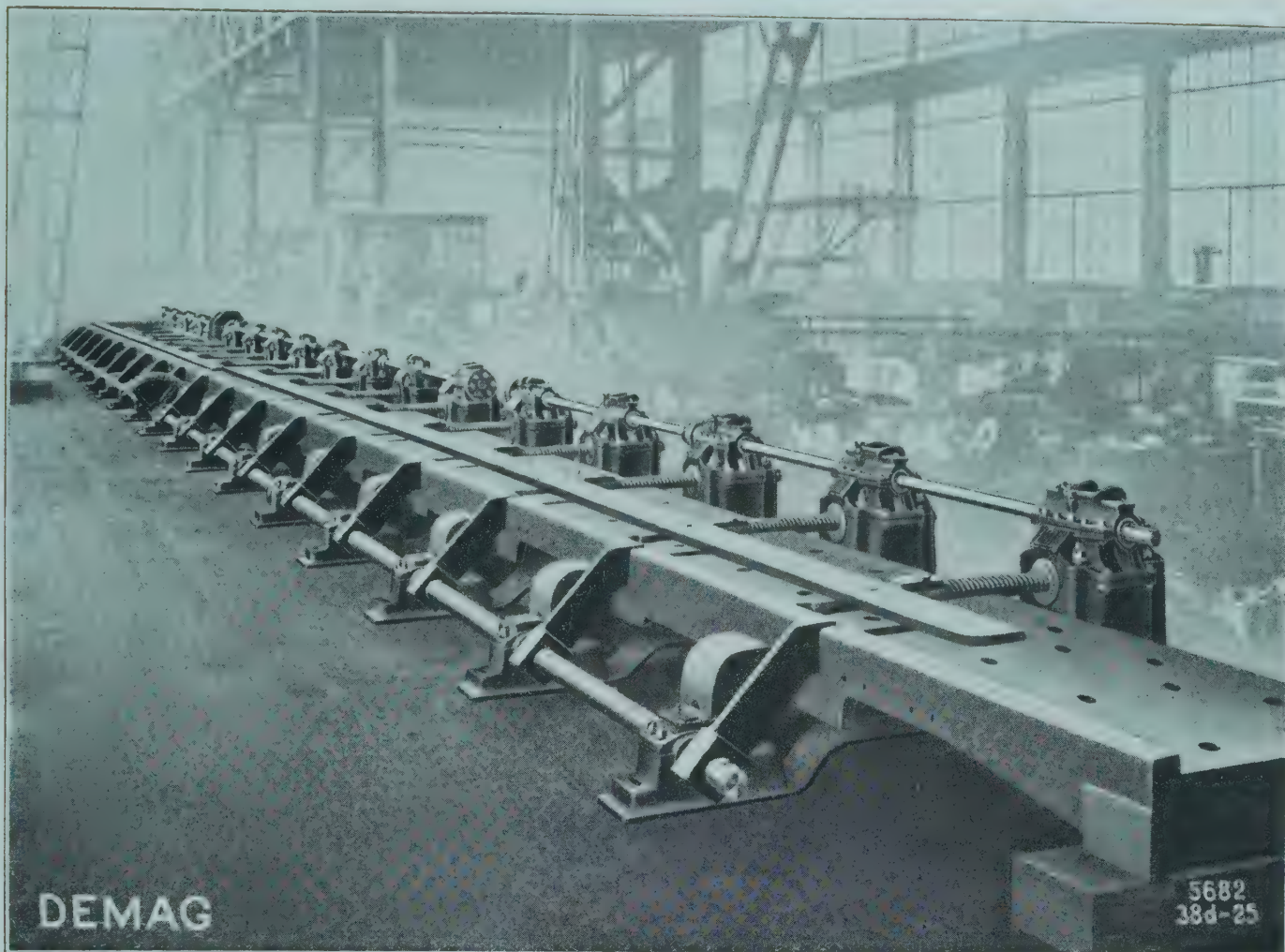


HOT BANK FOR THE 800 mm. UNIVERSAL MILL / DELIVERED FOR THE VEREINIGTEN HÜTTENWERKE BURBACH-EICH-DÜDELINGEN, AKTIENGESELLSCHAFT, DEPARTMENT: ESCHWEILER BERGWERKSVEREIN, ESCHWEILER

Electric sheet bar skid and high level lip before the straightening bank. Vereinigte Hüttenwerke Burbach-Eich-Düdelingen, Eschweiler Bergwerksverein, Eschweiler.

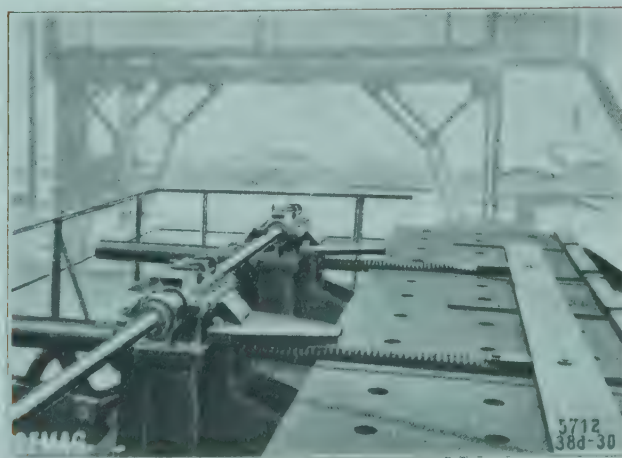




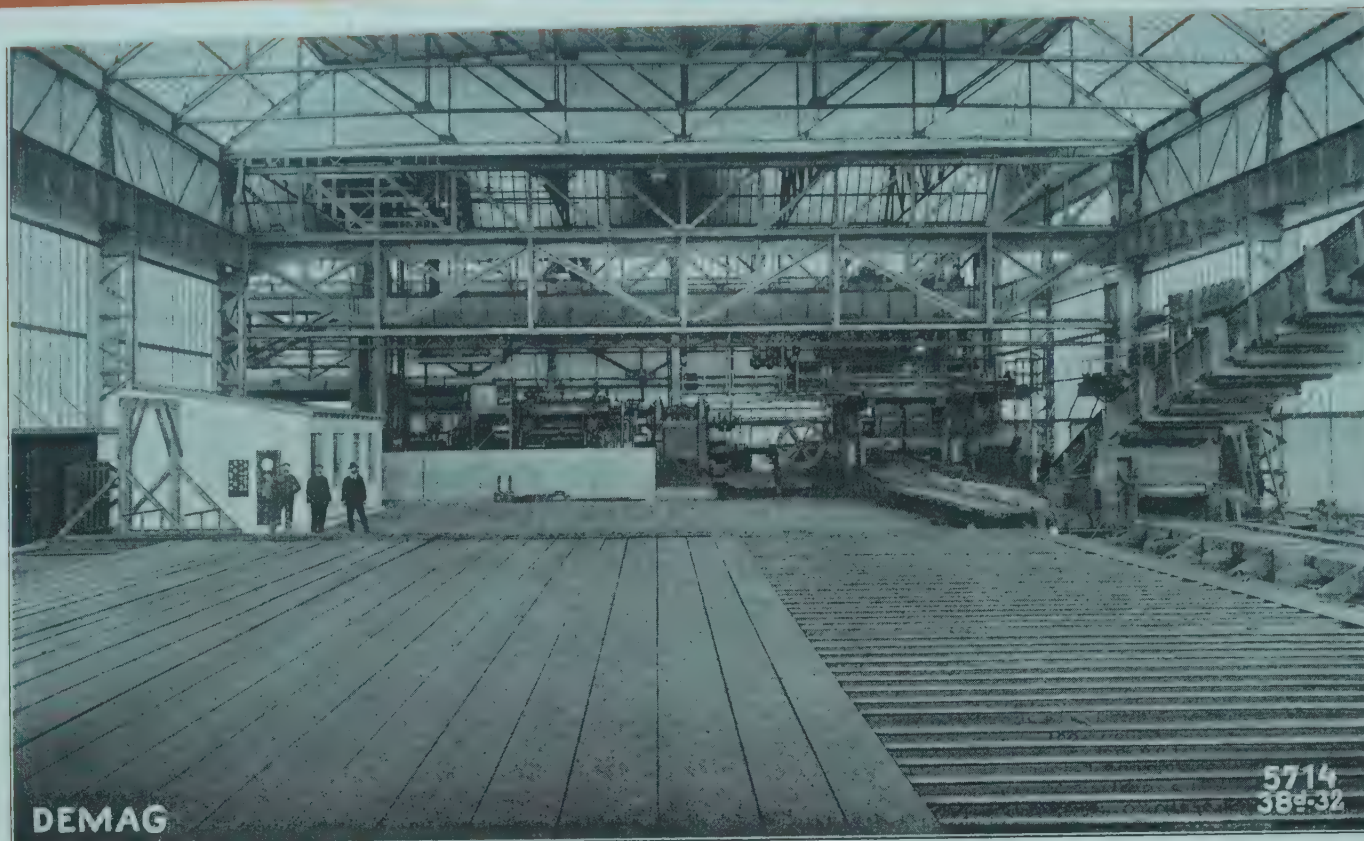


ELECTRIC STRAIGHTENING BANK WITH LIFTING DEVICE FOR STRIPS UP TO 600 mm. IN WIDTH, ERECTED IN THE ERECTING SHOP DELIVERED FOR THE DEUTSCH-LUXEMBURGISCHE BERGWERKS-UND HÜTTEN-A.-G., DEPARTMENT: DORTM. UNION, DORTMUND

Electric straightening bank for strips up to 1300 mm. in width. Vereinigte Hüttenwerke Burbach-Eich-Düdelingen, Dep.: Eschweiler Bergwerksverein, Eschweiler.



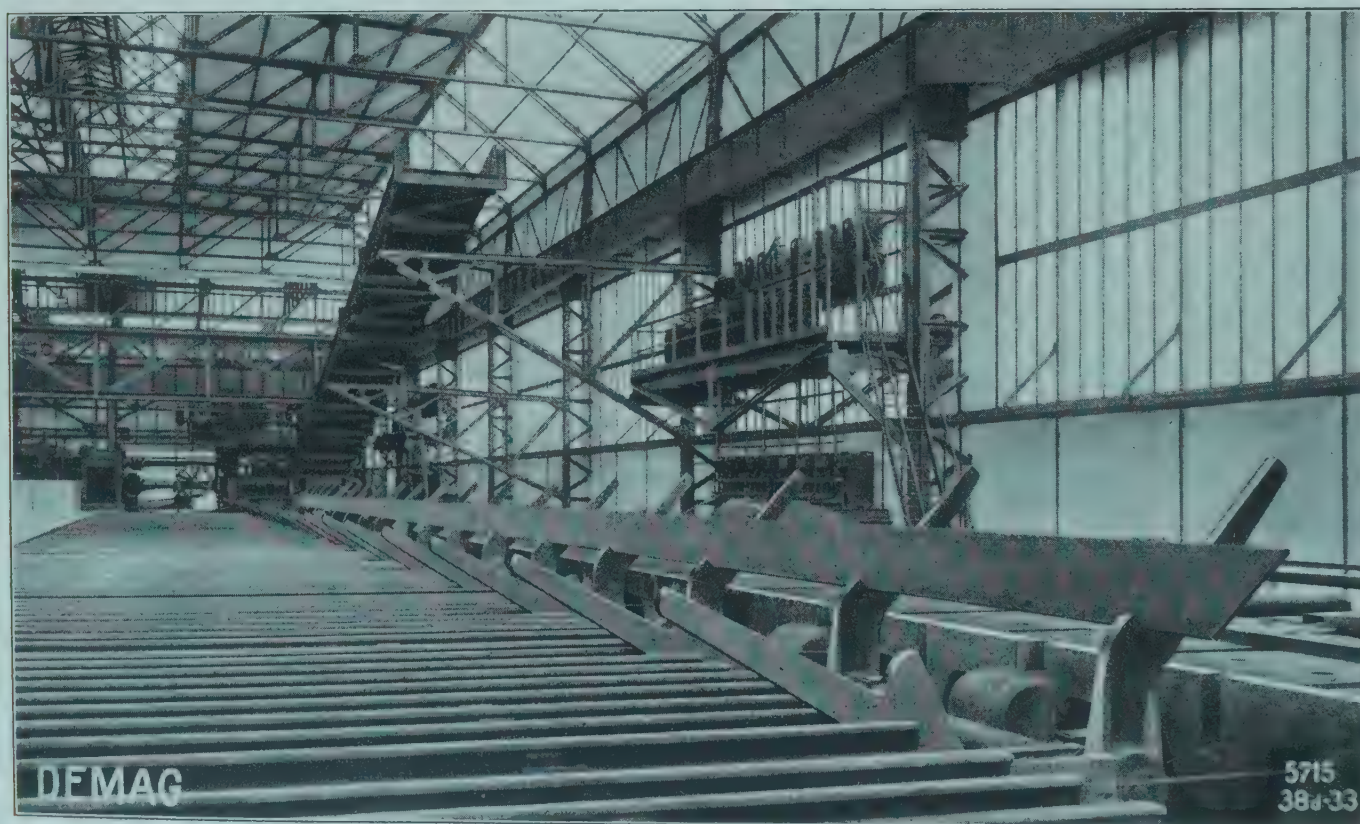




800 mm. Universal Three-High Mill with Hot bank.

VEREINIGTE HÜTTENWERKE BURBACH-EICH-DÜDELINGEN,  
DEPARTMENT: ESCHWEILER BERGWERKSVEREIN, ESCHWEILER

Universal Iron Lifting Device for the above Mill, Levers in the Reversing Position.







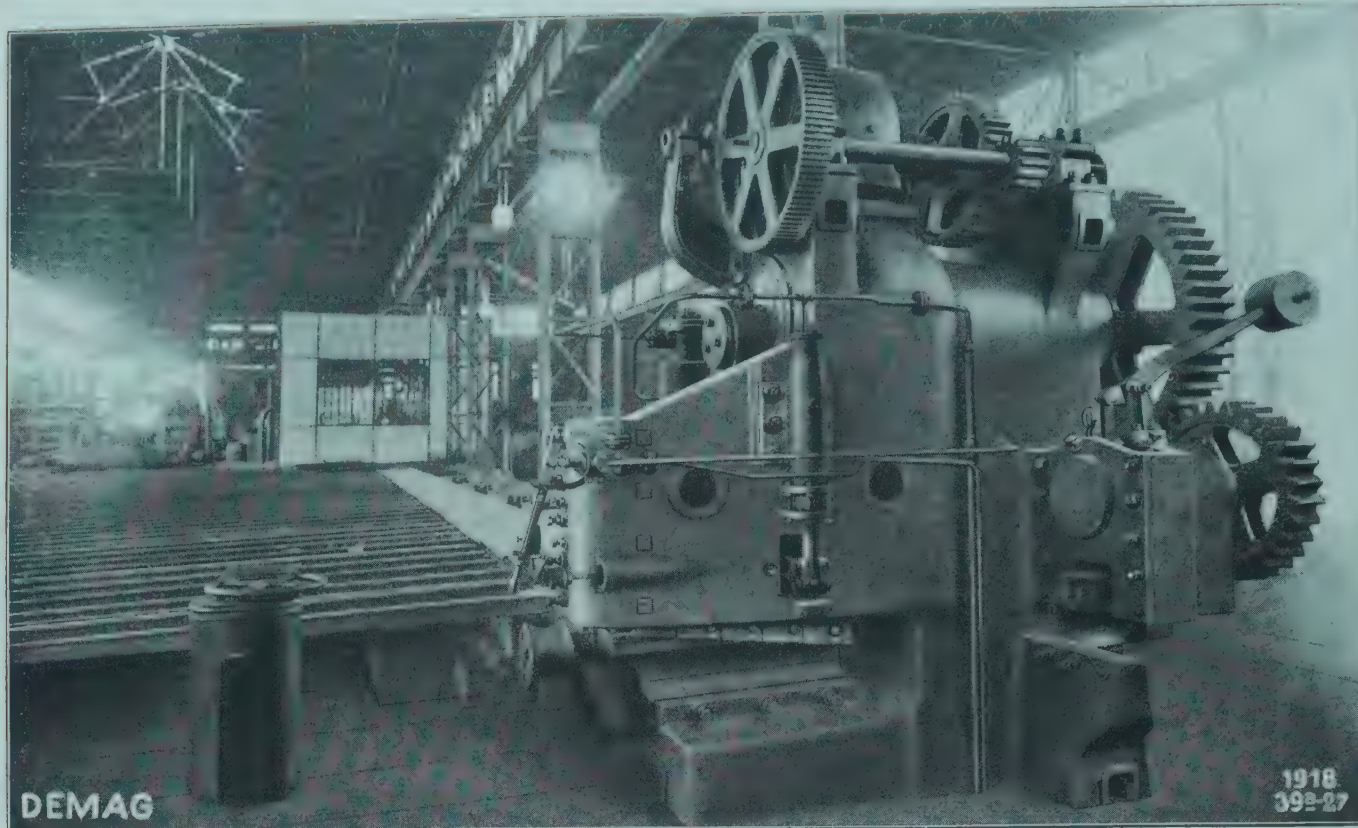
Vereinigte Hüttenwerke Burbach-Eich-Düdelingen, Burbacher Hütte.

UNIVERSAL IRON HOT BANK  
WITH ELECTRIC SKIDS

Deutsch-Luxemb. Bergwerks- u. Hütten-A.-G., Dept.: Dortm. Union, Dortmund.

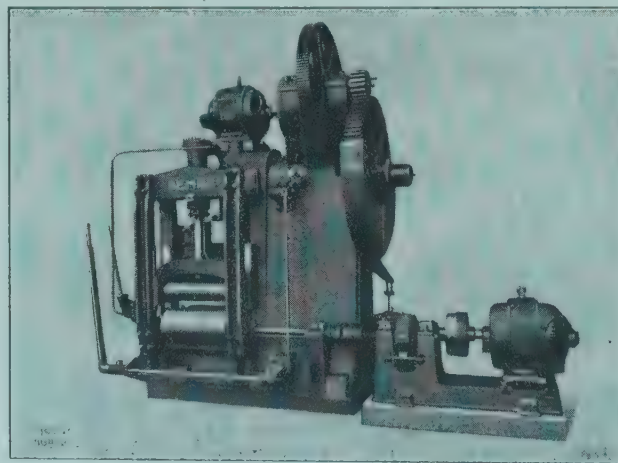




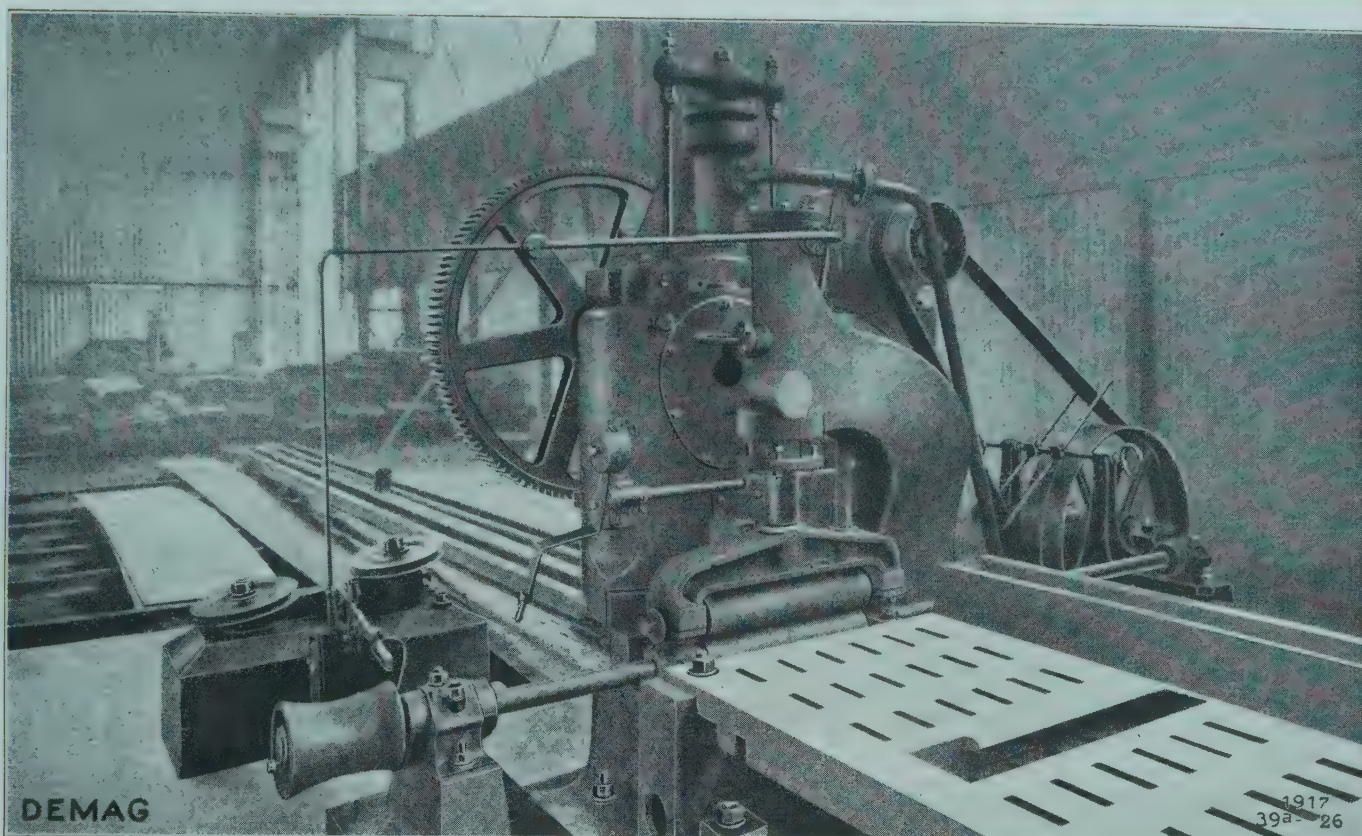


ELECTRIC SHEARING MACHINE FOR UNIVERSAL IRON WITH WASTE SHEARS  
DELIVERED FOR THE HAHNSCHE WERKE AKTIENGES., GROSSENBAUM

The shearing machine illustrated above is capable of cutting cold sheet bars up to  $1050 \times 30$  mm. For moving the sheet bars there are a sheet bar skid and a capstan. Attached to the frame is a waste shearing machine for cutting cold scrap iron  $500 \times 20$  mm. The shears work without fly-wheel. The lower illustration shows an electric universal iron shearing machine with skid built in. The bottom roll is driven by a special motor, the top one by hydraulic power.

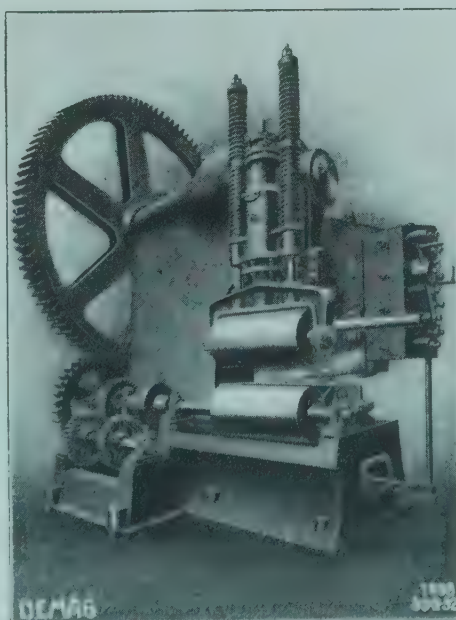






ELECTRIC UNIVERSAL IRON SHEARING MACHINE / DELIVERED FOR THE HAHNSCHE WERKE AKTIENGESellschaft, GROSSENBAUM

The above universal iron shearing machine cuts strips up to 1050 by 13 mm. cold, and is fitted with a skid and capstan for bringing up the material from the straightening bank. The illustration below shows an electric universal iron shearing machine with skid attached. The bottom roll is driven from the shearing machine motor by means of countershaft gear, the top roll being worked by hydraulic power.







ELECTRIC SHEET BAR STACKING DEVICE / DELIVERED FOR THE GELSENKIRCHENER BERGWERKS-A.-G., DEPARTMENT: ADOLF-EMIL-HÜTTE, ESCH A. D. ALZETTE

**T**his device consists of seven standards constructed as hollow castings, in which racks used as guides move. The latter are fitted with tappets arranged so as to turn on joint pins and held in a horizontal position by stops. In side casings in the standards there are also rotating tappets which, as in the racks, can be tilted upwards; these, too, are held in a horizontal position by stops. The stacking device works as follows: — When so many sheet bars have been piled on the roller gear that they have to be removed the racks are moved upwards. The tappets, which were until now beneath the roller gear, take hold of the sheet bars on the roller gear from below and lift them off the latter, taking them along with them. During this process the tappets in the standards are tilted upwards and fall into a horizontal position again on reaching the top, as soon as the pile has released their top end. On lowering the racks the pile now remains on the tappets, from which it can be removed by claw cranes and conveyed to the stores. The racks and tappets then continue to fall automatically, being lifted on passing the material which has in the meantime been piled without any interruption on the roller gear. On reaching the starting point the process begins again without a pause. The main advantage of this stacking device lies in the fact that it is unnecessary to interrupt the rolling process even for a moment whilst the stacking device is at work.





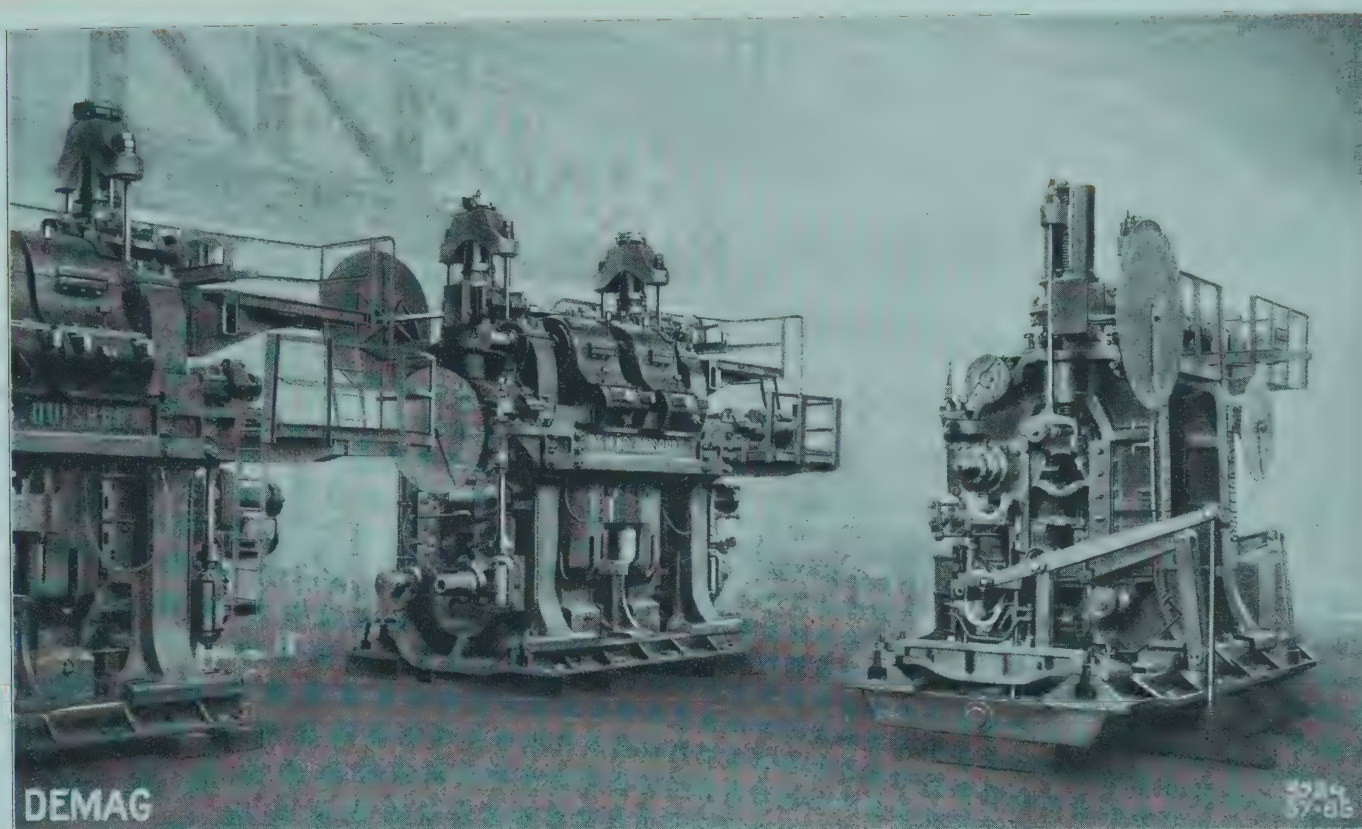
MAGNET CRANE FOR LOADING PLATES AND UNIVERSAL IRON / DELIVERED FOR THE DILLINGER HÜTTENWERKE A.-G., DILLINGEN A. D. SAAR

OVERHEAD TRAVELLING CRANE WITH SLEWING JIB, FITTED WITH MAGNET FOR LOADING UNIVERSAL IRON / DELIVERED FOR THE SOCIÉTÉ ANONYME DES FORGES ET ACIÉRIES DE LA MARINE ET D'HOMÉCOURT, HOMÉCOURT (MEURTHE ET MOSELLE)





# THREE THREE-HIGH UNIVERSAL HOUSINGS



LATEST TYPE FOR THE GREATEST ROLLING WIDTHS OF  
600, 800 AND 1150 mm. ERECTED IN  
OUR WORKSHOP.





## APPLIANCES FOR THE MANUFACTURE OF SEAMLESS TUBES

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**J**ust as manifold as the shapes, dimensions and purposes for which tubes and hollow goods of forged steel, copper alloys, aluminium and other metals are used are the machines and rolling mills with which they are manufactured. Owing to the great and constantly increasing claims on the efficiency and safety of the auxiliary apparatus employed now-a-days by industrial and shipbuilding concerns, air-ship and aeroplane works and traffic, seamless hollow goods of pressed or rolled steel are generally demanded, which are made into smooth or corrugated shell-rings, turbine cylinders, tanks for holding and transporting compressed air etc., guns, pipes for naphtha, petroleum and steam, loading and bearing poles, boiler tubes and precision tubes for air-ship, aeroplane, motor car and bicycle construction. The manufacture of these articles consists of two main processes, the former of which is the boring of a hole lengthwise through the solid ingot, which is done either by the Mannesmann process or by means of a hydraulic press. The second process, which is to give the working piece the exact dimensions, is effected in rolling mills described hereafter, that work on three different principles. The decision as to the advisability of employing one or other of these three systems depends on the nature of the ingots to be used and the purpose for which the finished product is intended. In order to avoid manual labour as far as possible, for fining and finishing, and for transporting the half-finished and finished goods quickly from one machine to another, the modern tube mill also needs a number of auxiliary apparatus, some of which are shown in the following illustrations.



## PRESS FOR PERFORATING INGOTS

**C**ontrary to the solid ingots of circular cross-section used in the diagonal rolling mills described in the following pages, ingots of square cross-section are used in the ingot perforating press. These ingots, about one metre in length, are consigned to a die in the form of a slightly conical hollow cylinder. A hydraulic punch now forces its way exactly into the centre of the ingot, perforating it along its whole length. The core of the material displaced by the punch in its forward motion exactly fills the four cavities between the punch and the solid square block, so that a hollow body of circular cross-section is formed. The introduction of the ingot into the die and the removal of the hollow block from the punch are also effected by hydraulic power. The presses, of which large numbers have been delivered, make hollow blocks of hollow diameters up to 150 mm.

## DIAGONAL ROLLING MILL FOR PERFORATING INGOTS

**T**he hollow rolling of solid ingots in the diagonal rolling mill is a peculiar process. Two rolls inclined to the horizontal, and both revolving in the same direction, move the solid round block within a few seconds over a mandrel, the foremost end of which lies between the rolls, its back end being held in an abutment, the block being revolved rapidly about its long axis. The hollow block is lengthened in proportion as its cross-section is smaller than that of the solid block put into the rolling mill. Particular attention must be called to the fact that by this process any graduation of inner and outer diameter may be obtained by adjusting the space between the two rolls of the rolling mill, provided the proper cylindrical form is chosen. The 35 rolling mills hitherto constructed by us in four different sizes make hollow blocks of inner diameters ranging from 15 to 360 mm. and outer diameters of 25 to 480 mm. in one rolling process.



## TWO-HIGH FINISHING ROLLS

**T**he oldest process of stretching thick walled hollow bodies into thin walled tubes, which is still very much in vogue, consists in graduated twin rolls reducing the material to the desired dimensions by several successive passes on mandrel-heads lying between the grooves of the rolls and held by rigid bars. The return movement of the tube bloom to the feed side of the rolling mill ready for the next pass, after it has been rolled its whole length over the thimble, is effected by hand, or to better advantage, both quickly and simply, by our patent mechanical device. The material was formerly introduced into the rolls by hand, but in more modern plants this is done by pneumatic pushers, which can be conveyed by electricity from one groove to another. Such rolling mills produce tubes the outer diameters of which range from 60 to about 150 mm.

## CONTINUOUS TUBE ROLLING MILLS

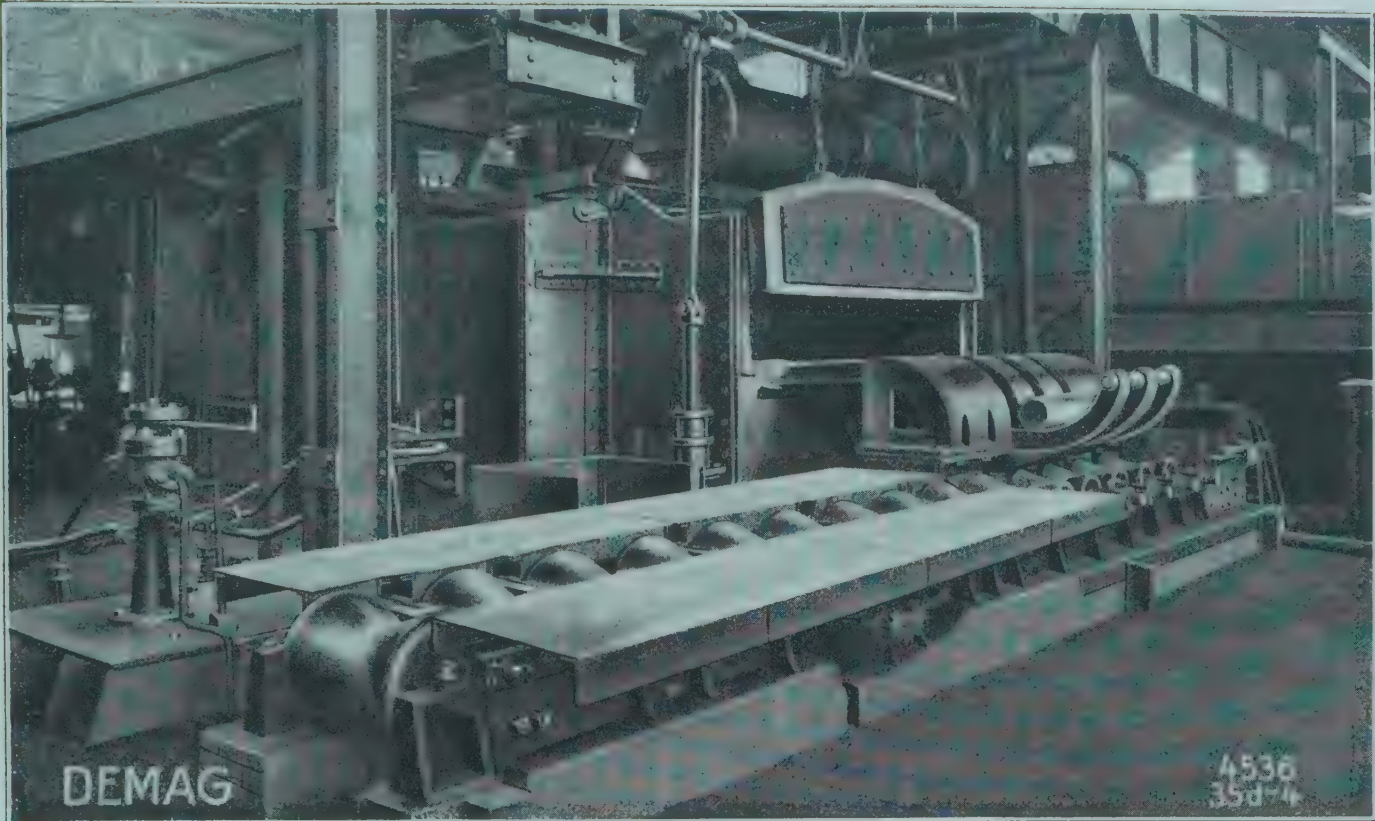
**A**s in the case of each continuous rolling mill for medium and small sections, in the continuous tube rolling mill the pair of rolls, which lie one behind the other, revolve with accelerating velocity. Under ordinary circumstances seven pair of rolls are employed in the continuous tube rolling mill, which are supported in the housings in such a way that the axes of each pair of rolls cross those of the preceding pair. When the hollow block leaves the fore-boring apparatus a cylindrical mandrel is introduced into it, after which it is passed into the rolling mill and drawn out to a tube in 5 or 6 seconds on the mandrel, which runs with it through the rolls, being rolled by all the different pairs of rolls almost at the same time. On leaving the rolling mill the tube, with the mandrel still in it, is taken by means of a cross skid to the mandrel extracting bed lying alongside the rolling mill, to have the mandrel extracted. This apparatus having taken the tube off the mandrel, the latter returns to the stores from which it had previously been taken. This process may be employed to advantage for tubes of 2 to 3 $\frac{1}{2}$ ".



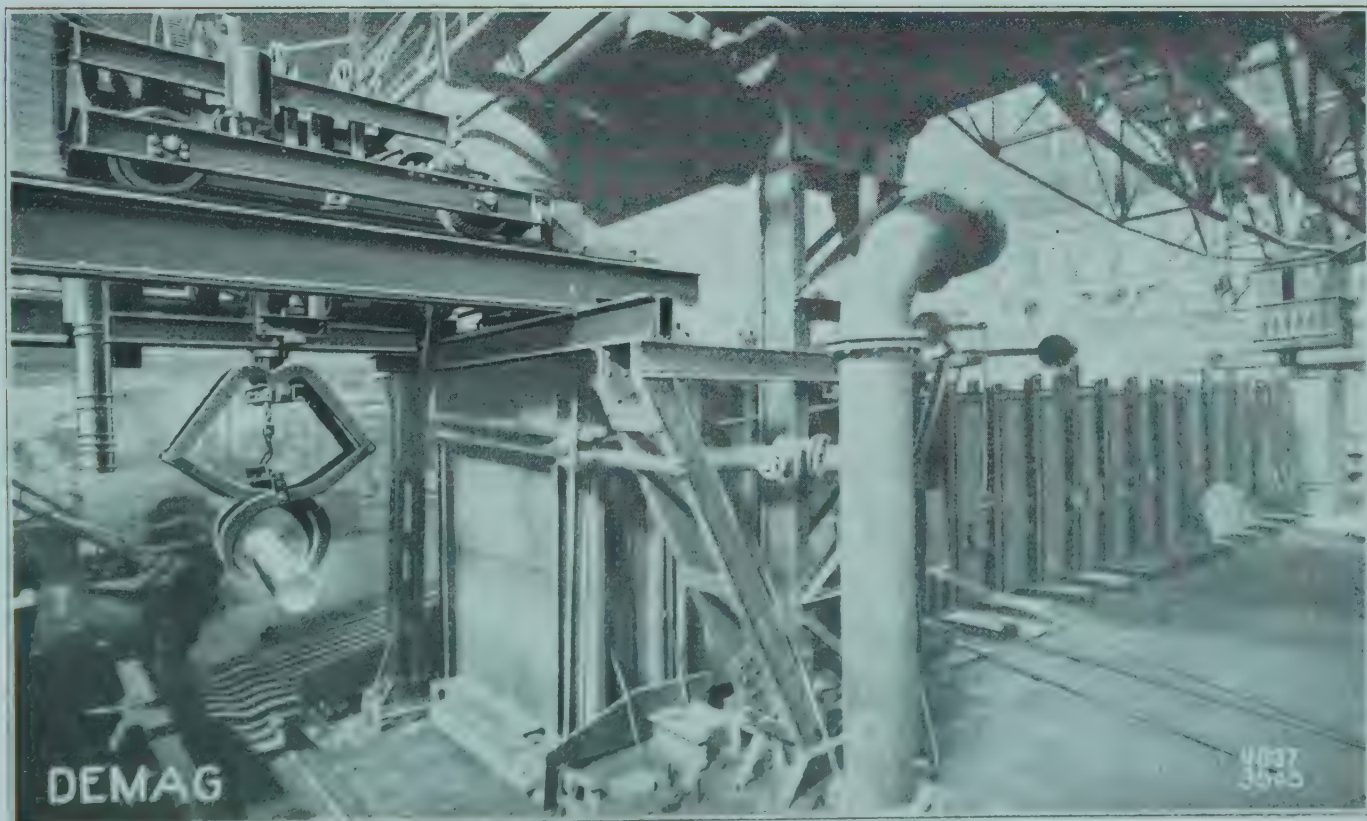
# PILGRIM TUBE ROLLING MILLS / DEMAG SYSTEM

**I**f seamless tubes of great length and of large diameters are to be produced the Pilgrim Tube Rolling Mill must be given the preference. Though this process was known as far back as the year 1856 it could not be put into practical use until the end of last century. — Contrary to the other tube drawing processes the practice on which the pilgrim process is based is carried out by one single pair of graduated rolls. The thick walled hollow cylinder, on a cylindrical steel mandrel, is introduced into the rolls against their direction of revolution. During one half of a revolution the two rolls, which are fitted with an excentric groove, throw back the block a certain distance, at the same time reducing its cross-section, whereas during the next half revolution of the rolls the feeding device attached in front of the housings pushes the block forward again mechanically, a little farther than it has been previously thrown back. By this alternating forward and backward pilgrimage of the block it is drawn out to a smooth, thin walled tube so quickly that it loses very little of its original heat. Those devices in these rolling mills, of which we have delivered large numbers, to which the most important work in this process is allotted have partly been patented by us. Hitherto we have constructed Pilgrim Tube Rolling Mills for producing tubes with outside diameters ranging from  $1\frac{3}{4}$  to 14".

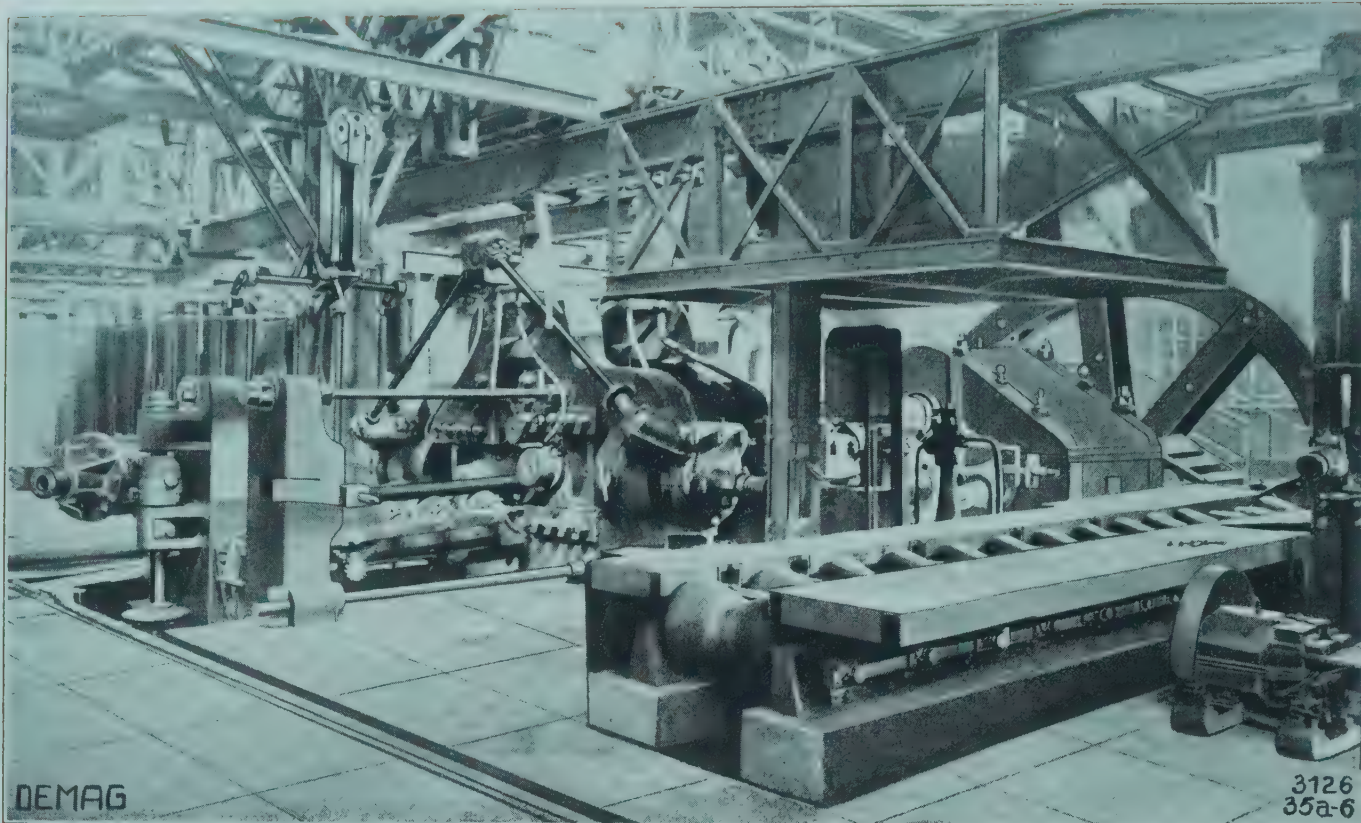




ROLLER GEAR CONVEYOR AND INGOT CRAB FOR ROUND INGOTS / DELIVERED FOR "BISMARCKHÜTTE", A.-G. FÜR EISEN-UND HÜTTENBETRIEB, BISMARCKHÜTTE, UPPER SILESIA

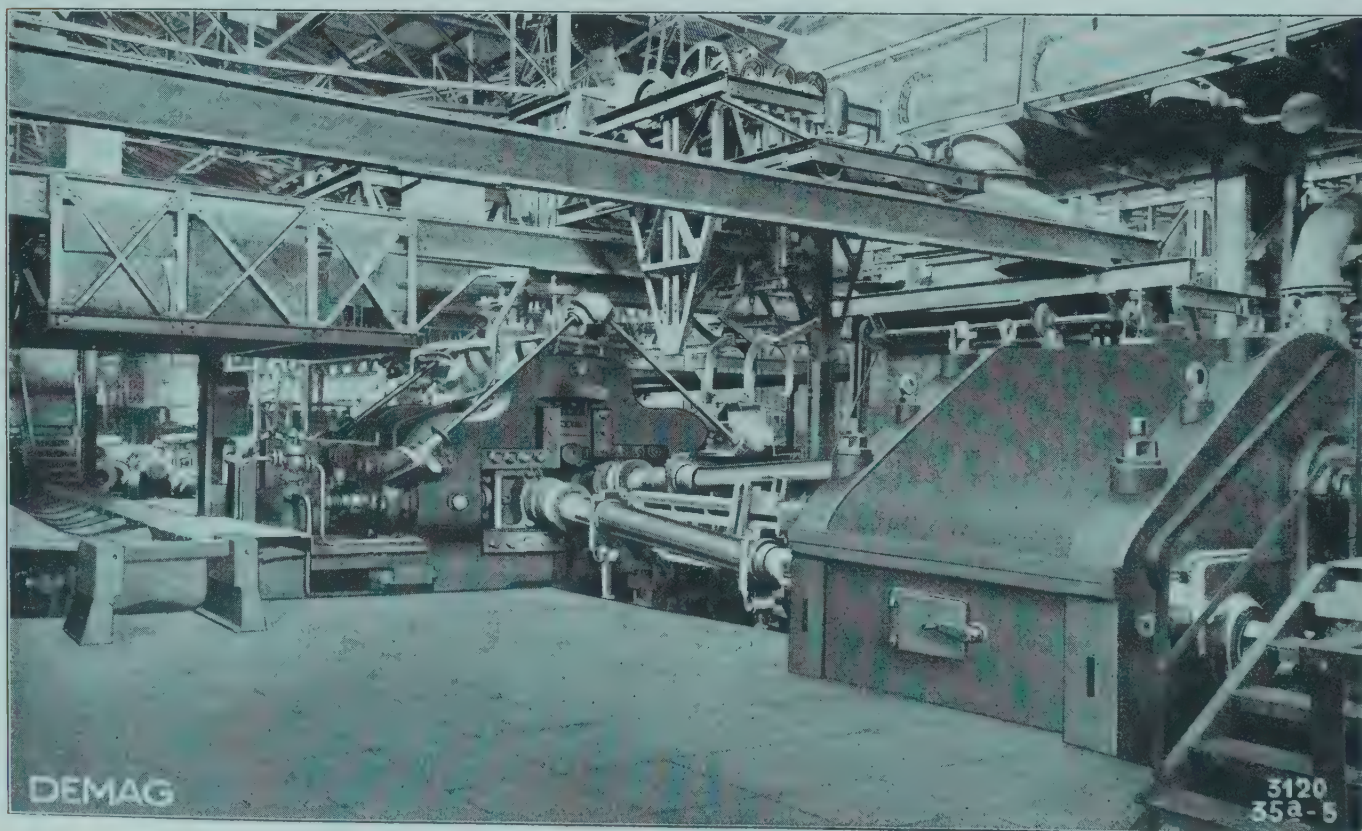




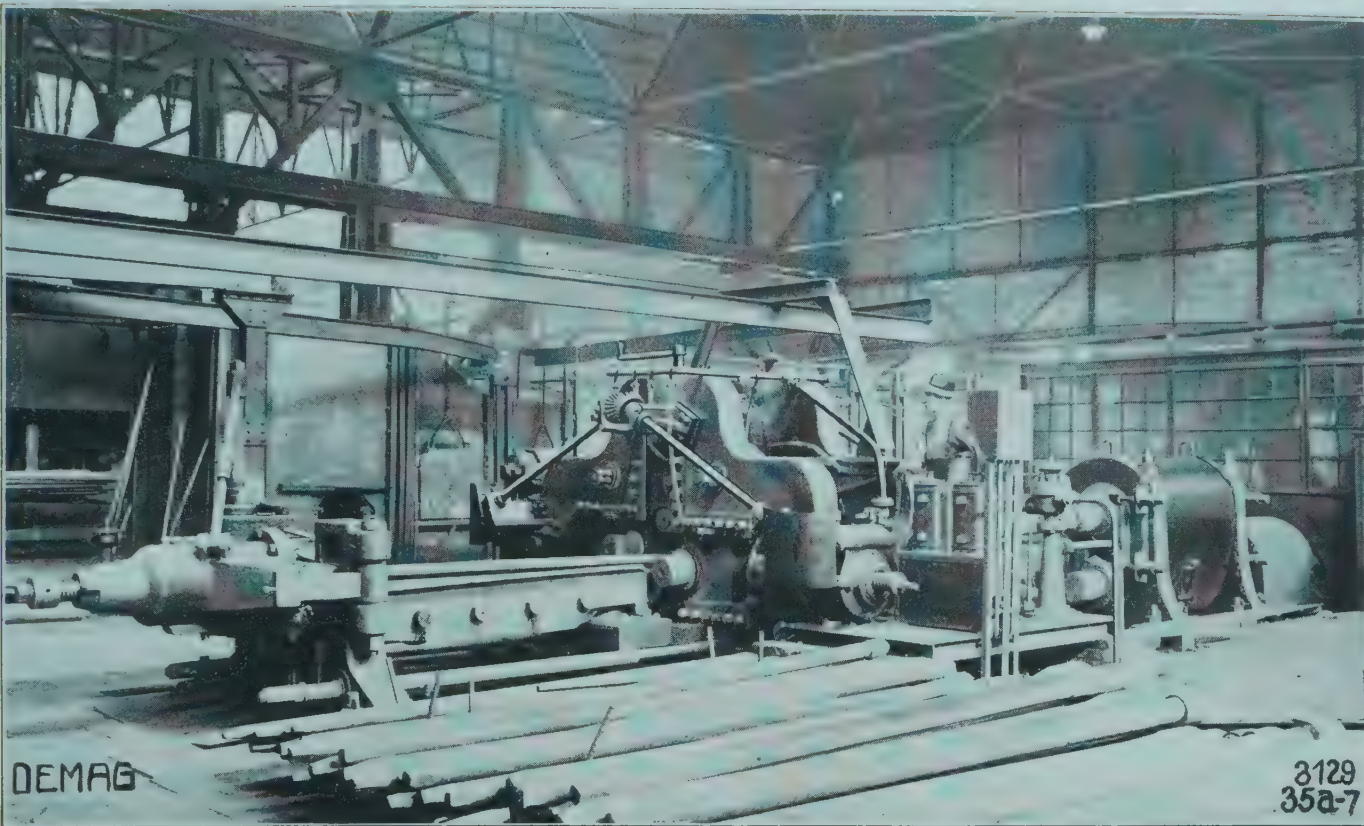


DIAGONAL ROLLING MILL F. MAKING HOLLOW BLOCKS F. SEAMLESS TUBES UP TO 13" IN DIAMETER / BISMARCKHÜTTE A.-G., BISMARCKHÜTTE, UP. SIL.

BACK VIEW OF THE ABOVE DIAGONAL ROLLING MILL





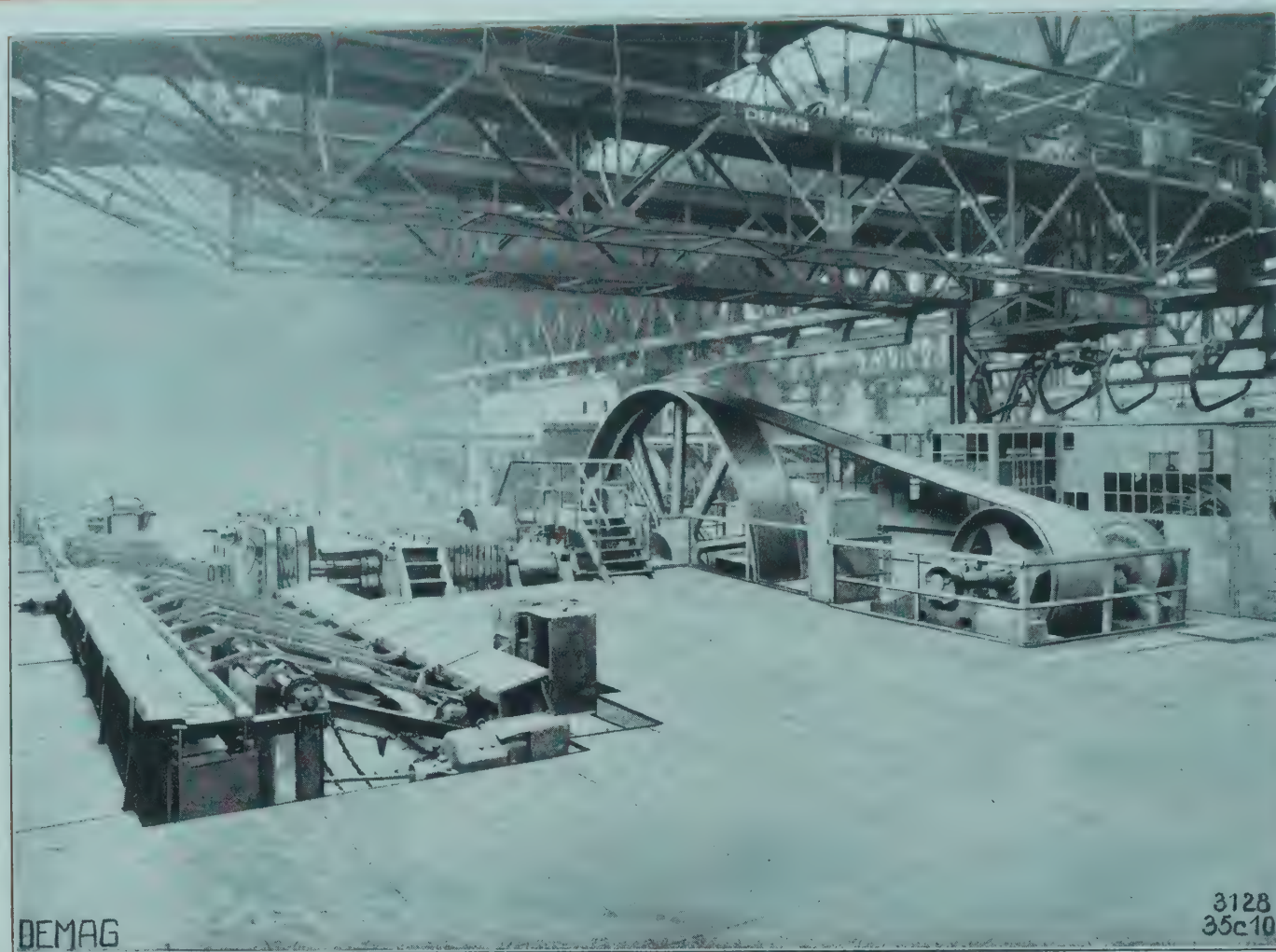


DIAGONAL ROLLING MILL MAKING HOLLOW BLOCKS FOR SEAMLESS TUBES OF 3 TO 6 $\frac{1}{2}$ " IN DIAMETER / BISMARCKHÜTTE, A.-G., BISMARCKHÜTTE

ELECTRIC DIAGONAL ROLLING MILL FOR MAKING COPPER TUBES

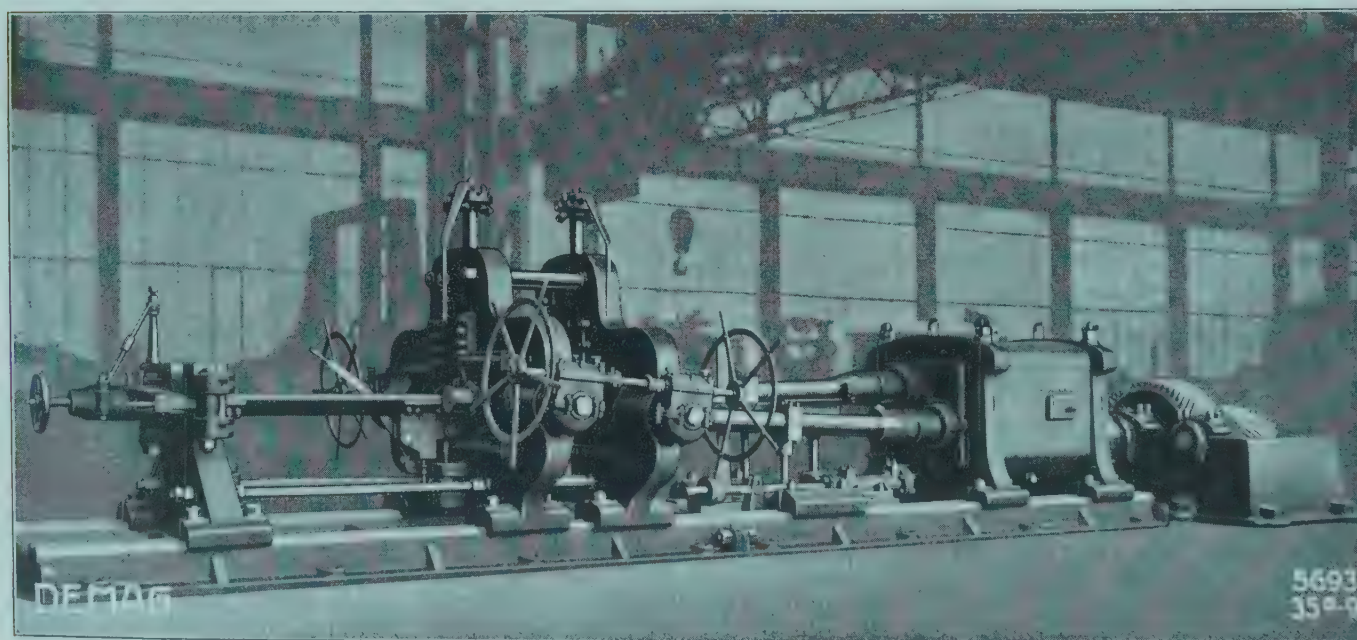






ELECTRIC CONTINUOUS TUBE ROLLING MILL

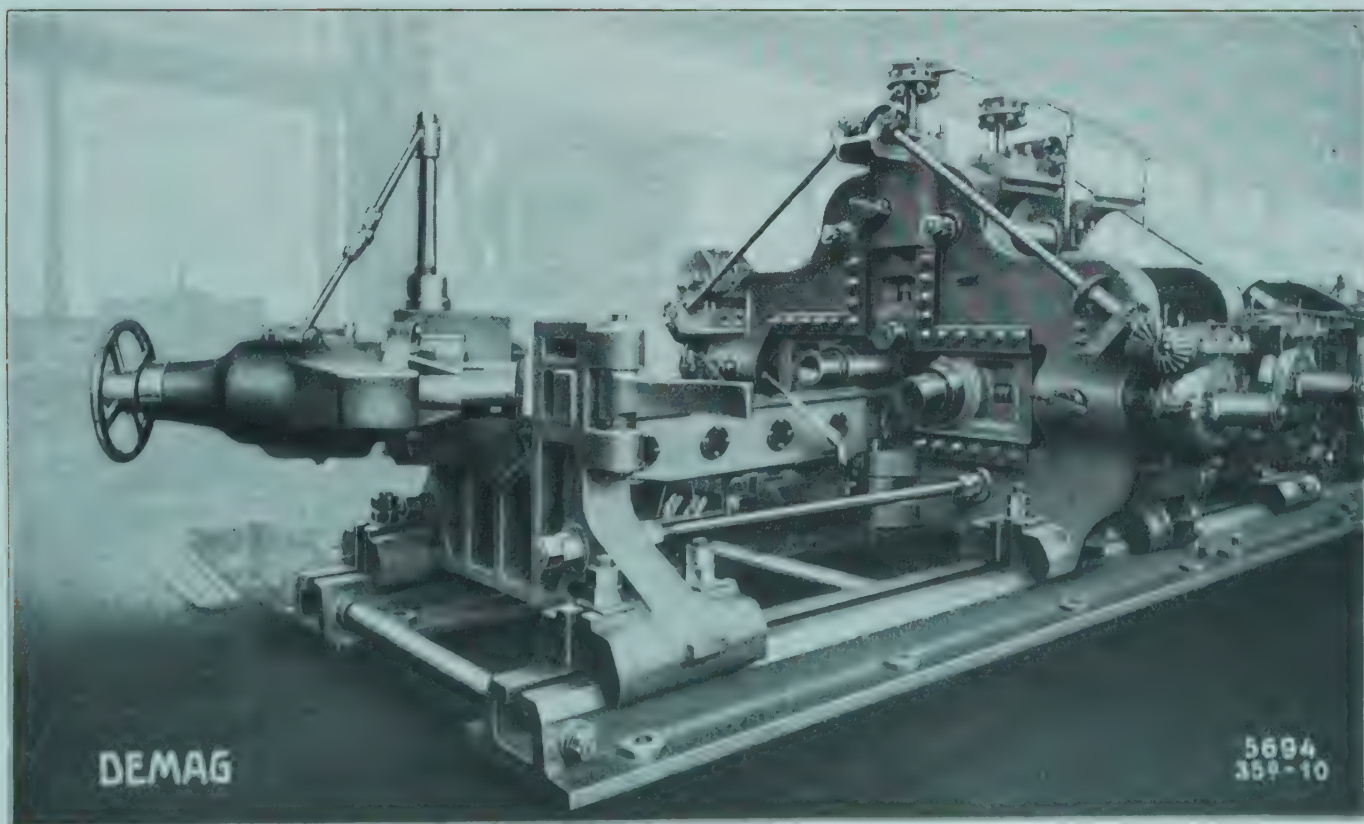
DIAGONAL ROLLING MILL ERECTED IN THE WORKSHOP



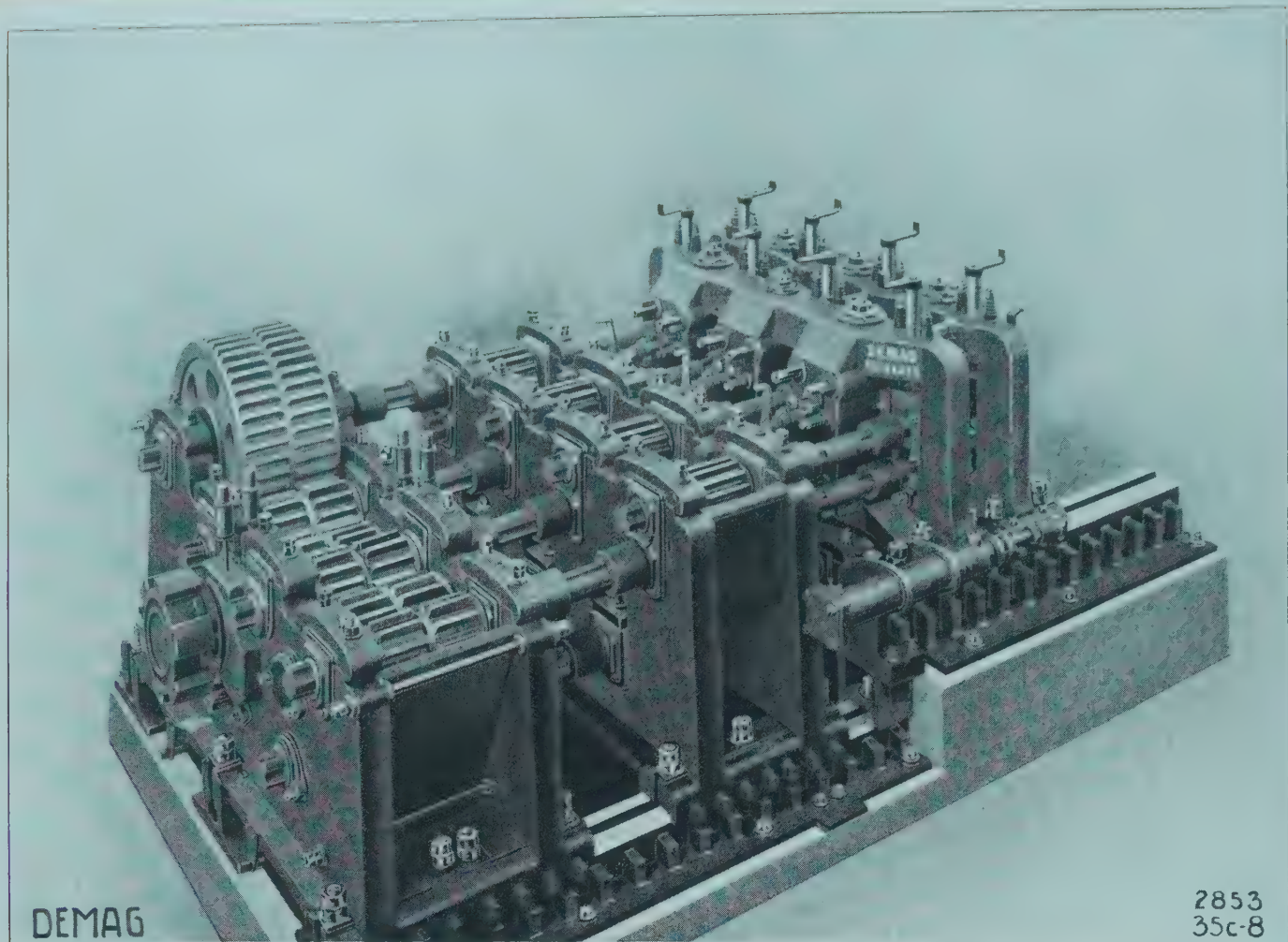




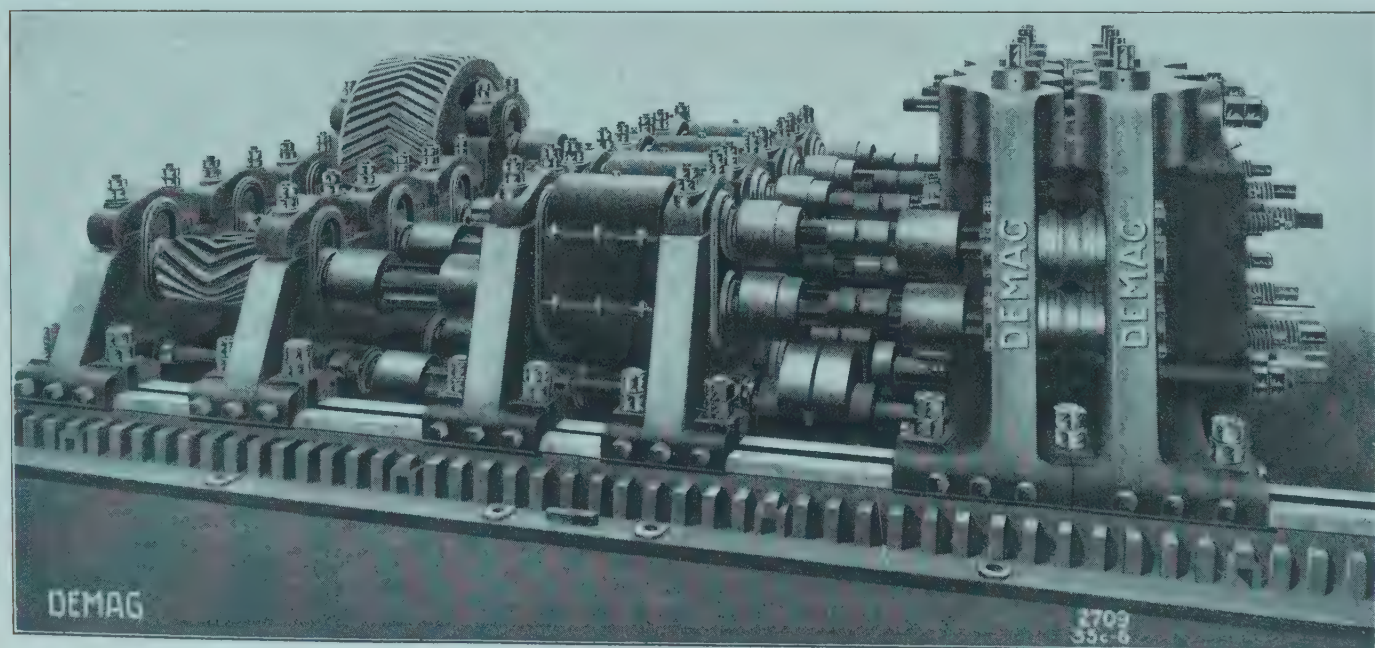
Diagonal Rolling Mills for Making Tubes (From a Photograph taken in the Workshop)



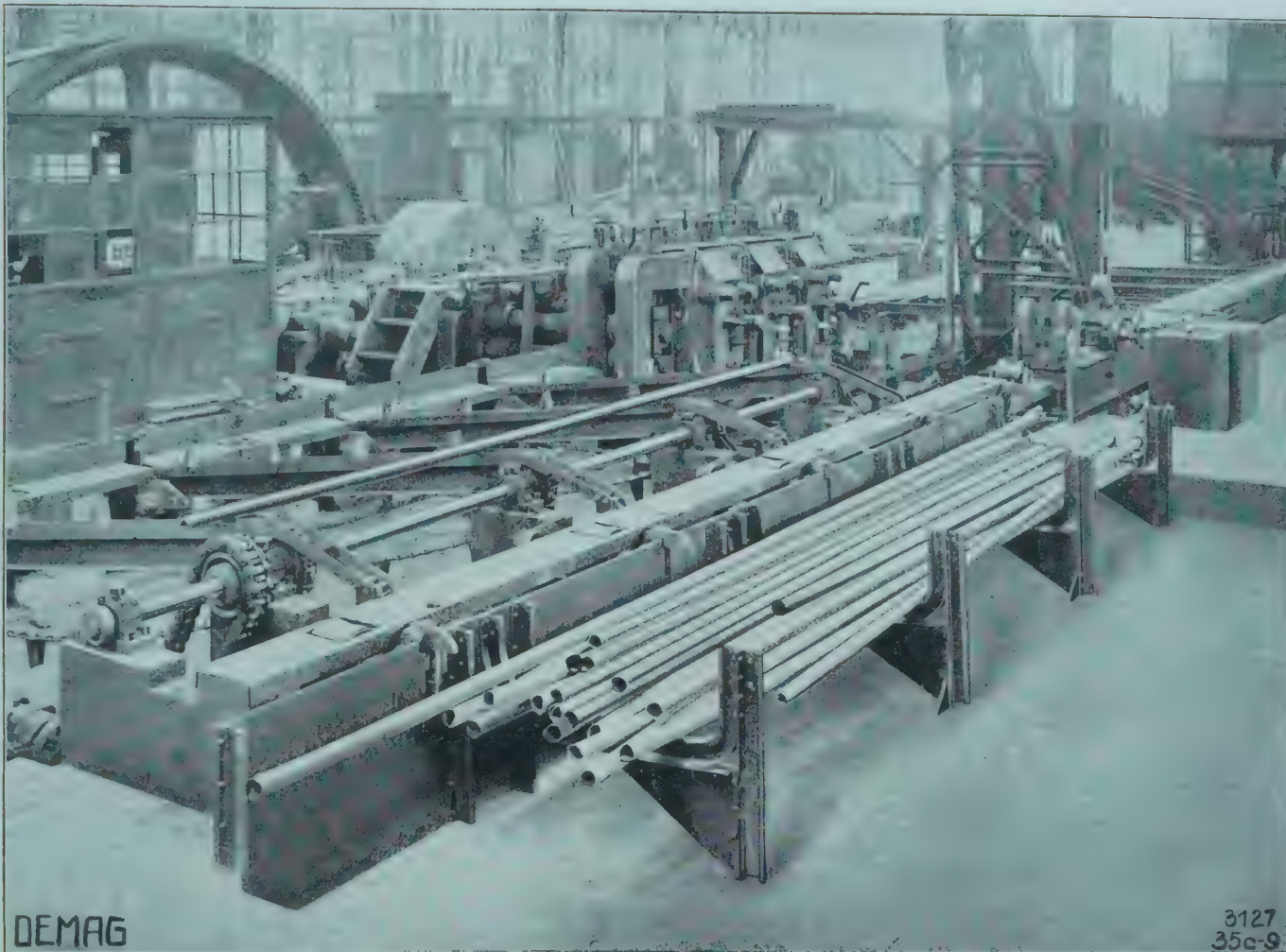




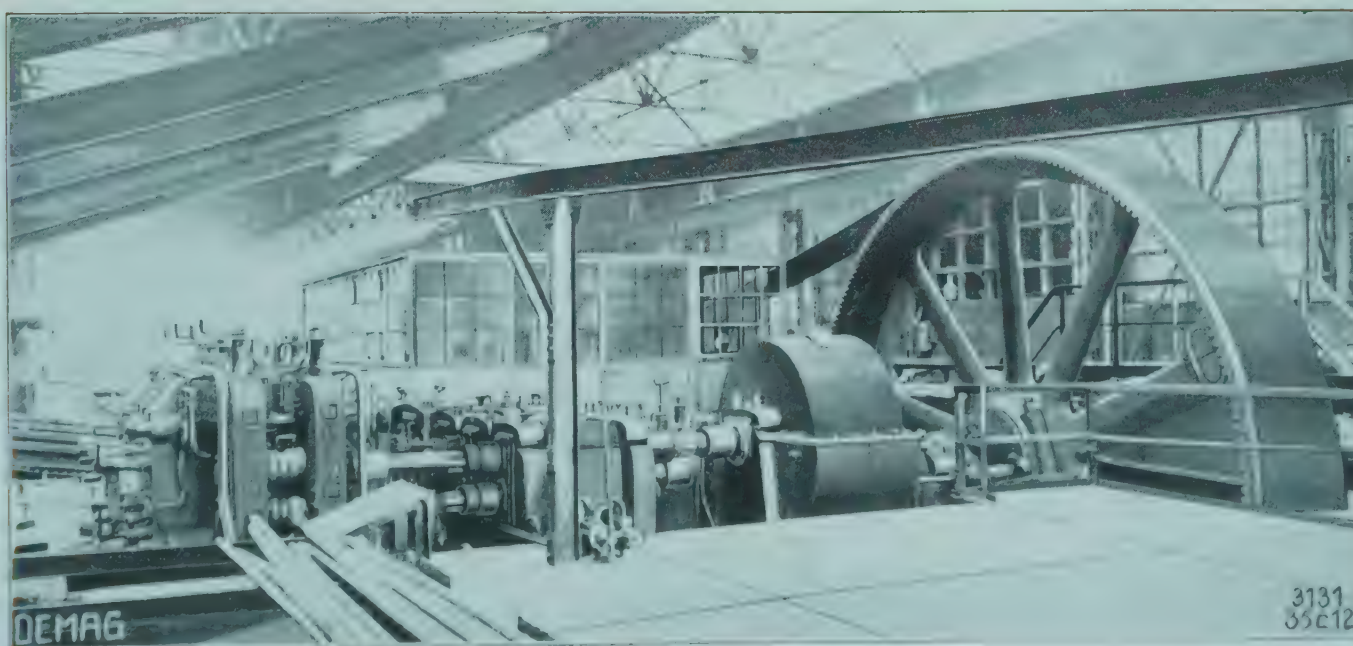
**CONTINUOUS TUBE ROLLING MILLS**  
 These photographs, taken in our workshop whilst the rolling mills were being erected there, show very clearly the substantial construction of our tube rolling mills.





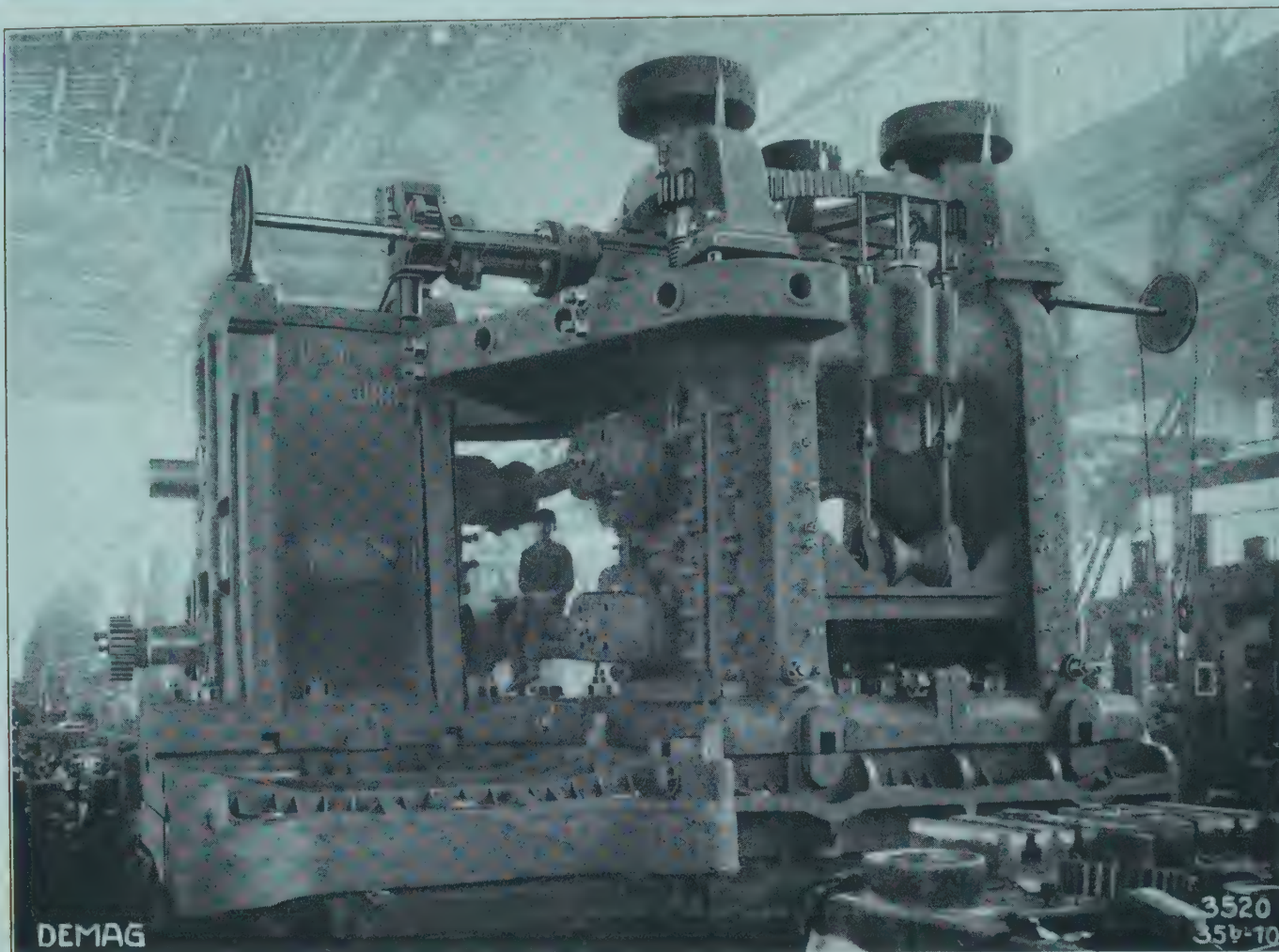


**CONTINUOUS ROLLING MILL FOR MAKING SEAMLESS TUBES**  
 Deliv. f. the Bismarckhütte, A.-G., Bismarckhütte, U.S. Rolling mills of this description  
 have been built by us of various constructions for different dimensions of tubes.



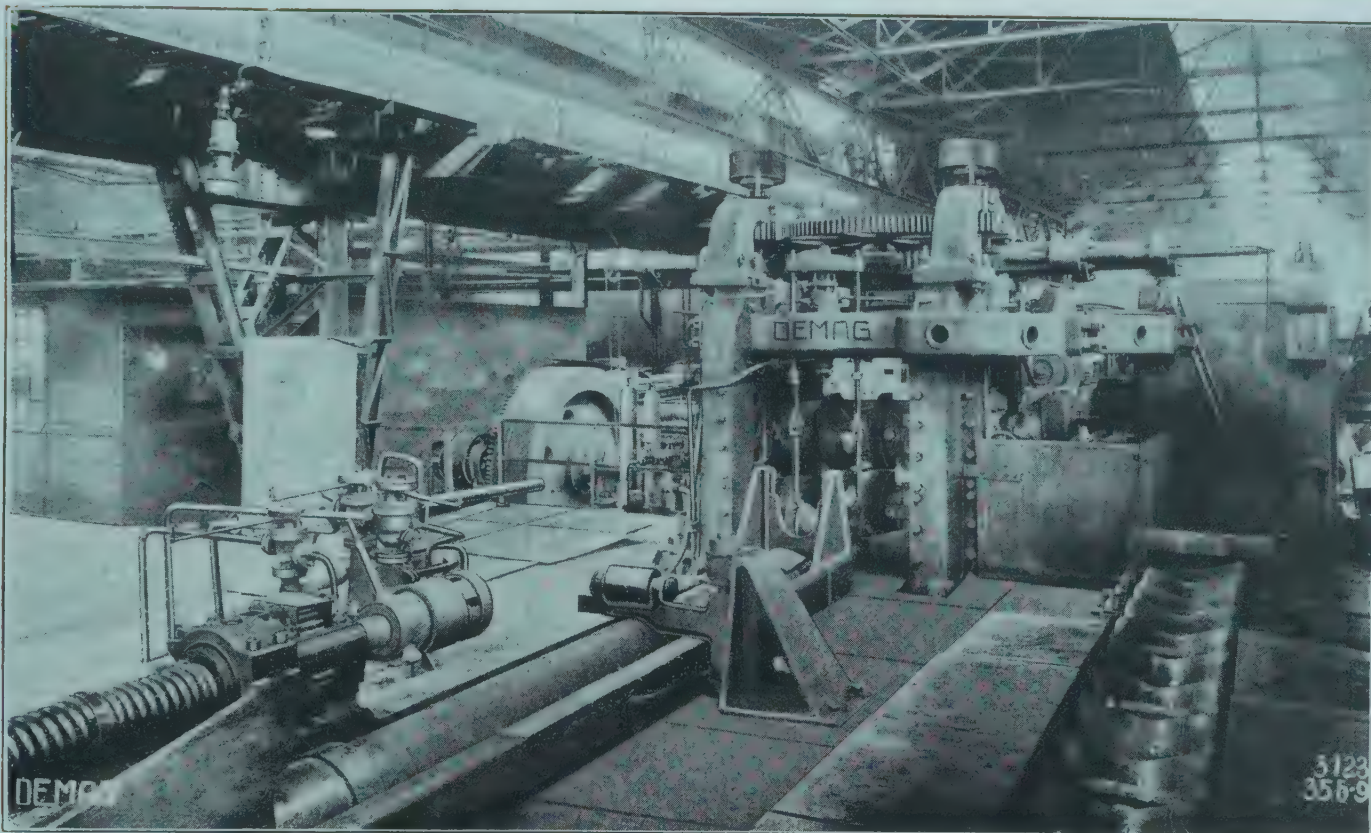


# PILGRIM TUBE ROLLING MILL DELIVERED TO RUSSIA



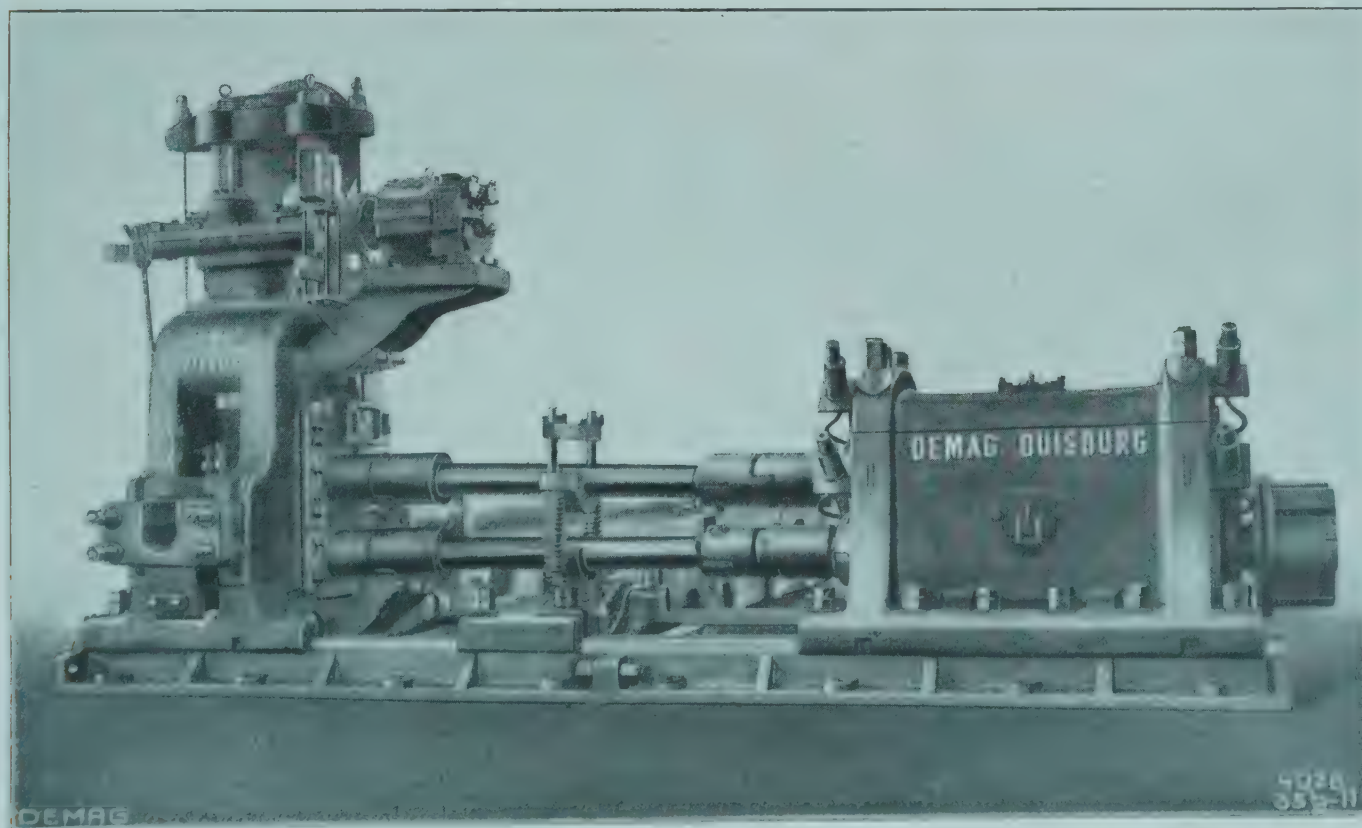
On this rolling mill, which works on the Perrins process, tubes are rolled up to an outer diameter of 14" and of a standard length of 12 metres. The top roll is adjusted by hydraulic power. To the left of the spindle housings will be attached a second housings, so that the two symmetrical housing are driven from the middle.



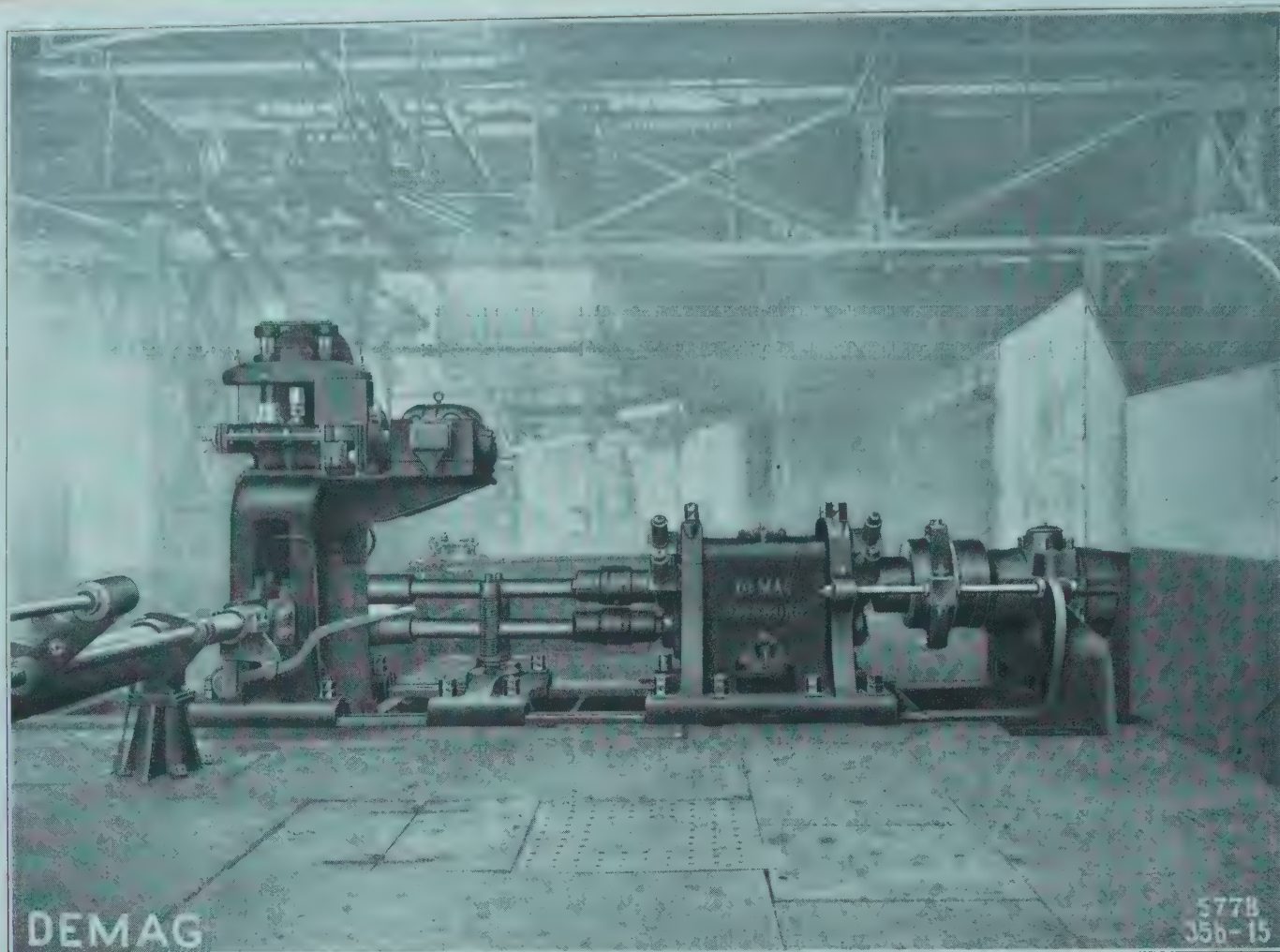


PILGRIM TUBE ROLLING MILLS FOR MAKING SEAMLESS TUBES OF LARGE DIMENSIONS

PILGRIM TUBE ROLLING MILL, DEMAG SYSTEM, IN COURSE OF ERECTION IN OUR ERECTING SHOP

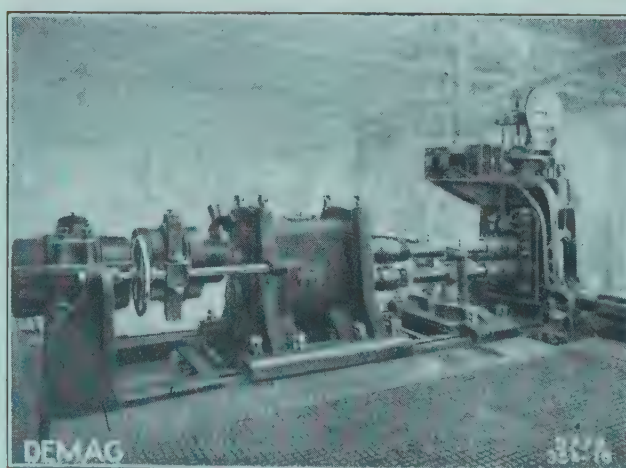




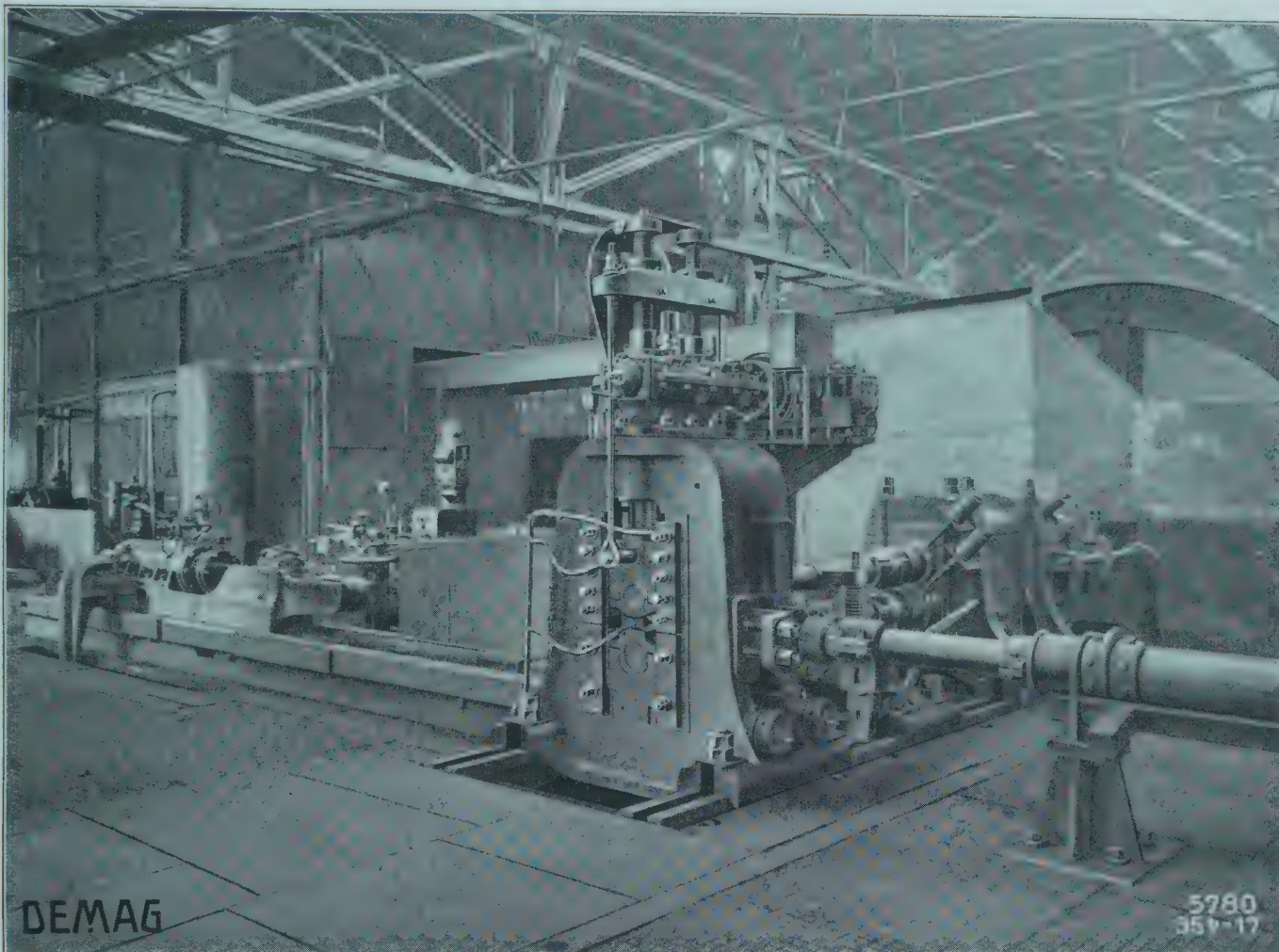


**PILGRIM TUBE ROLLING MILL "DEMAG SYSTEM"  
LARGE NUMBERS MADE FOR FIRMS BOTH AT HOME  
AND ABROAD / GERMAN AND FOREIGN PATENTS**

The top roll is adjusted and counter-balanced by electricity.  
The ball joint couplings are fitted with a compensating device  
for the exact adjustment of the conical grooves of the rolls.

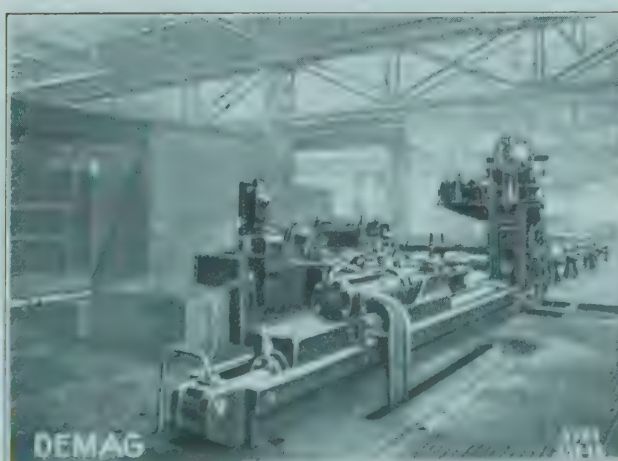




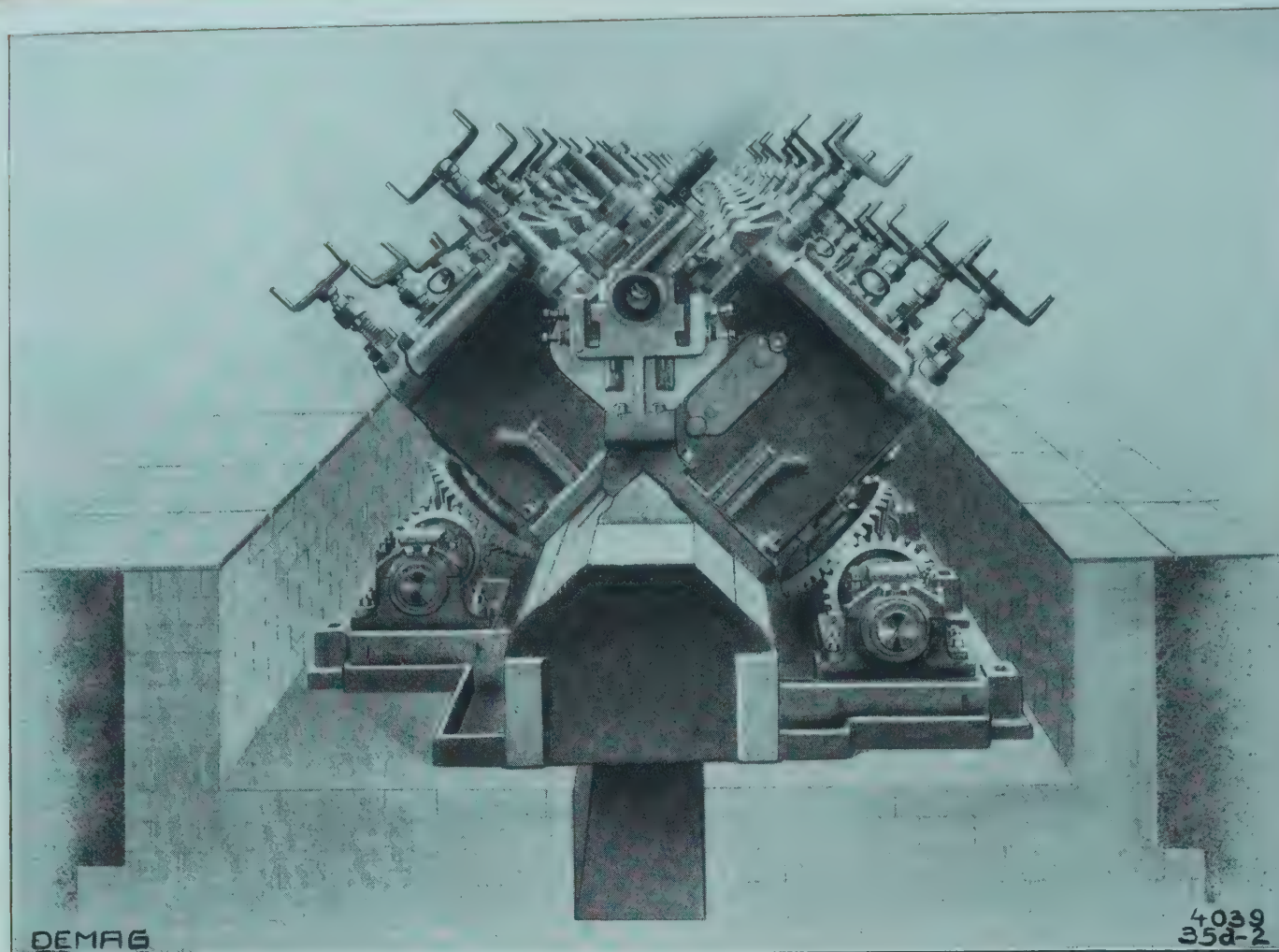


PILGRIM TUBE ROLLING MILL "DEMAG SYSTEM"  
LARGE NUMBERS MADE FOR FIRMS BOTH AT HOME  
AND ABROAD / GERMAN AND FOREIGN PATENTS

The material is brought up by a non-jerking pneumatic feeder, in which, owing to the peculiarity of its construction, there is theoretically no consumption of air.



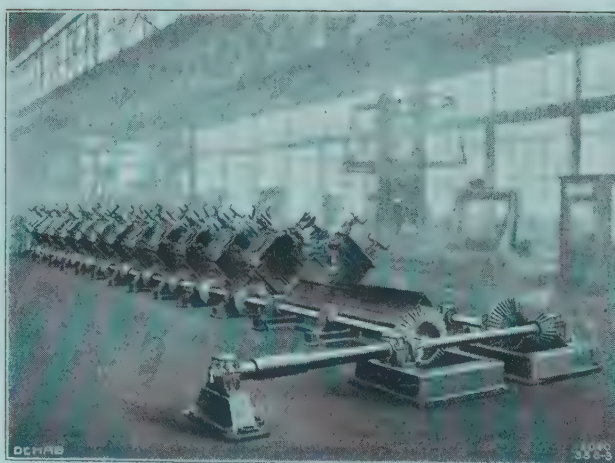




## REDUCING ROLLING MILL FOR SEAMLESS TUBES OF 2" TO $\frac{3}{4}$ " DIAMETER (FRONT VIEW)

With the help of the above purely continuous reducing rolling mill the cost of production of small seamless tubes may be reduced to such an extent as to enable them to compete with welded tubes. The tube blooms,  $2\frac{1}{2}$ " to 2" in diameter, are put into the rolling mill, which reduces them to a smaller diameter at one pass without the use of a mandrel.

The accompanying illustration shows a set of reducing rolls erected in our workshop.



The number of housings depends on the extent to which the diameter of the tubes is to be reduced.





## REDUCING ROLLING MILL / DELIVERED FOR THE STORSFORS BRUKS AKTIEBOLAG, STORSFORS (SWEDEN)

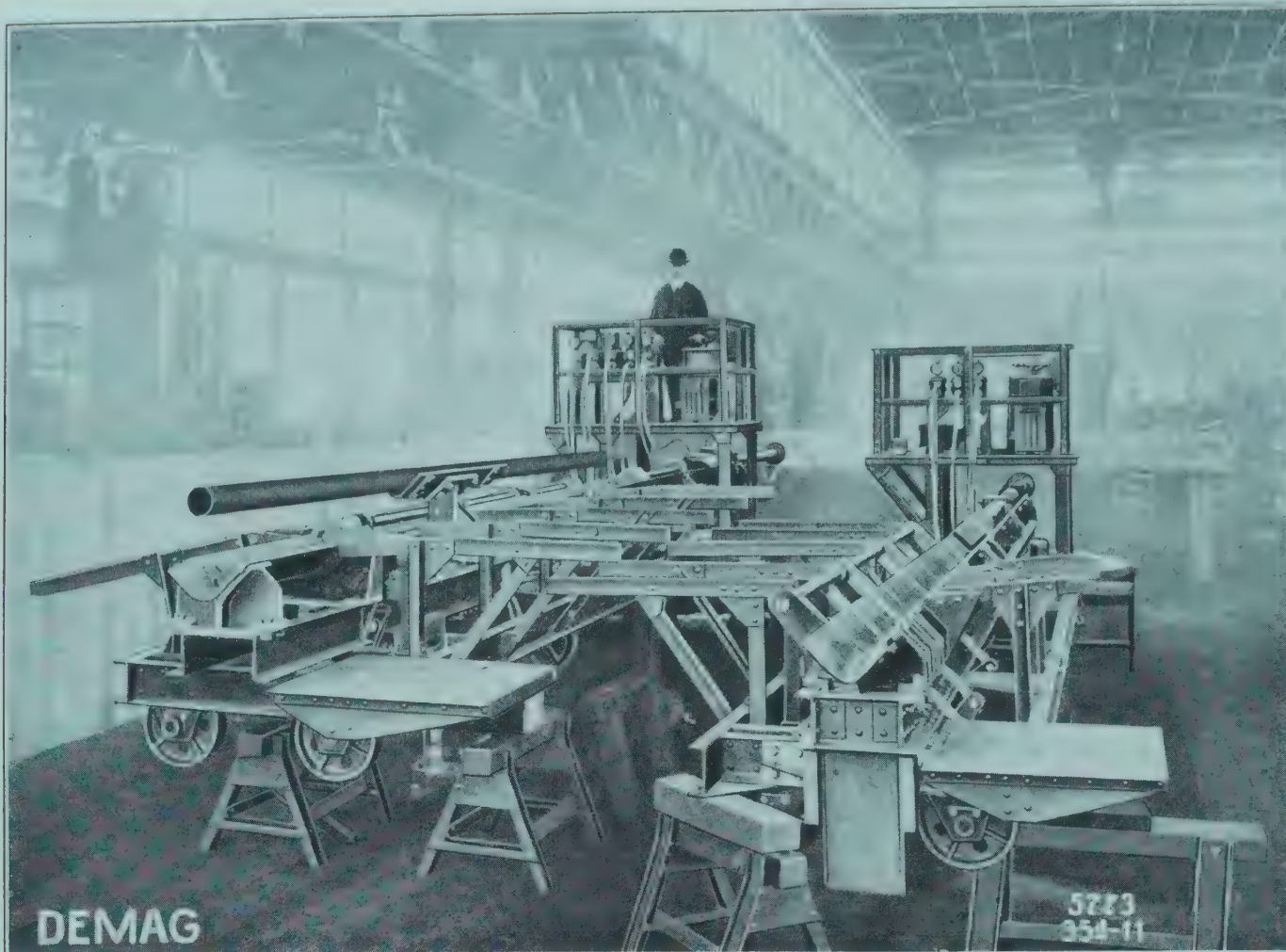
In the rolling mills hitherto in use for making seamless tubes the steel ingot, after being bored, is drawn out to a tube over a mandrel. By this means only tubes of at most 2" in diameter can be economically made, so that for the production of smaller tubes it is advisable to add a reducing rolling mill.

Rolling mill for smoothing tubes and equalising the thickness of the walls.

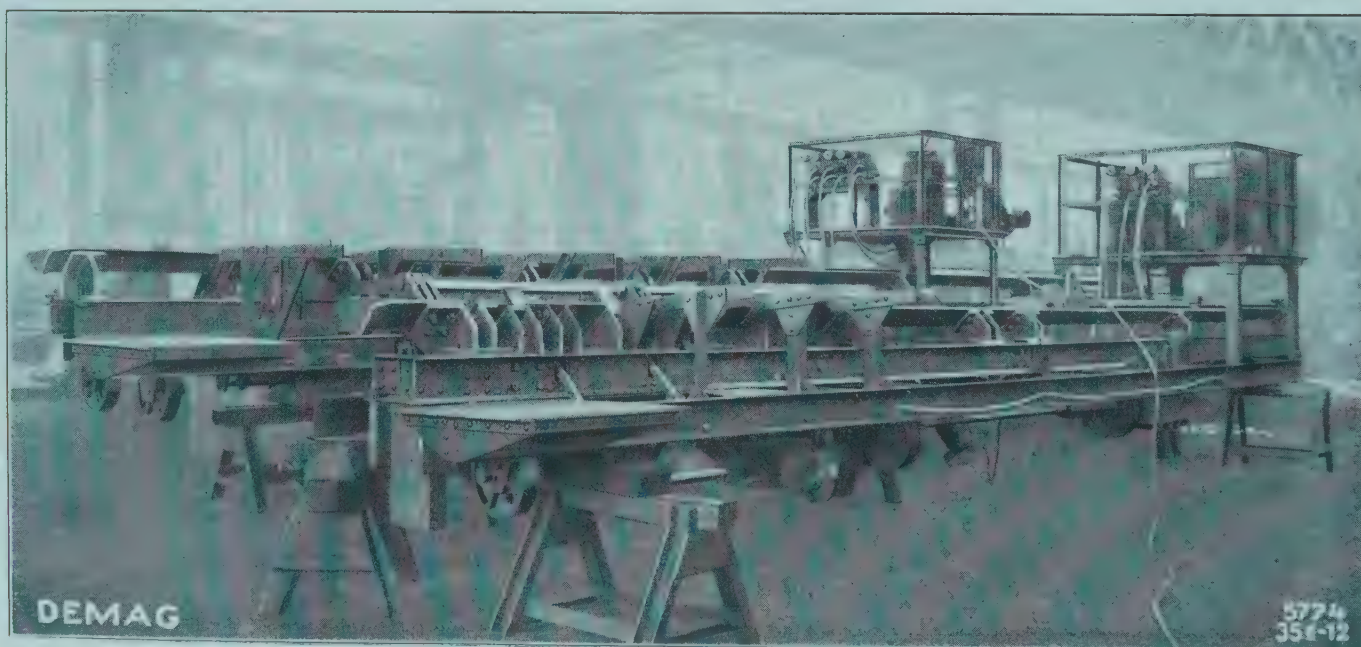


Large numbers made for firms both at home and abroad, for tubes of 2" to 6 1/2" in diameter.

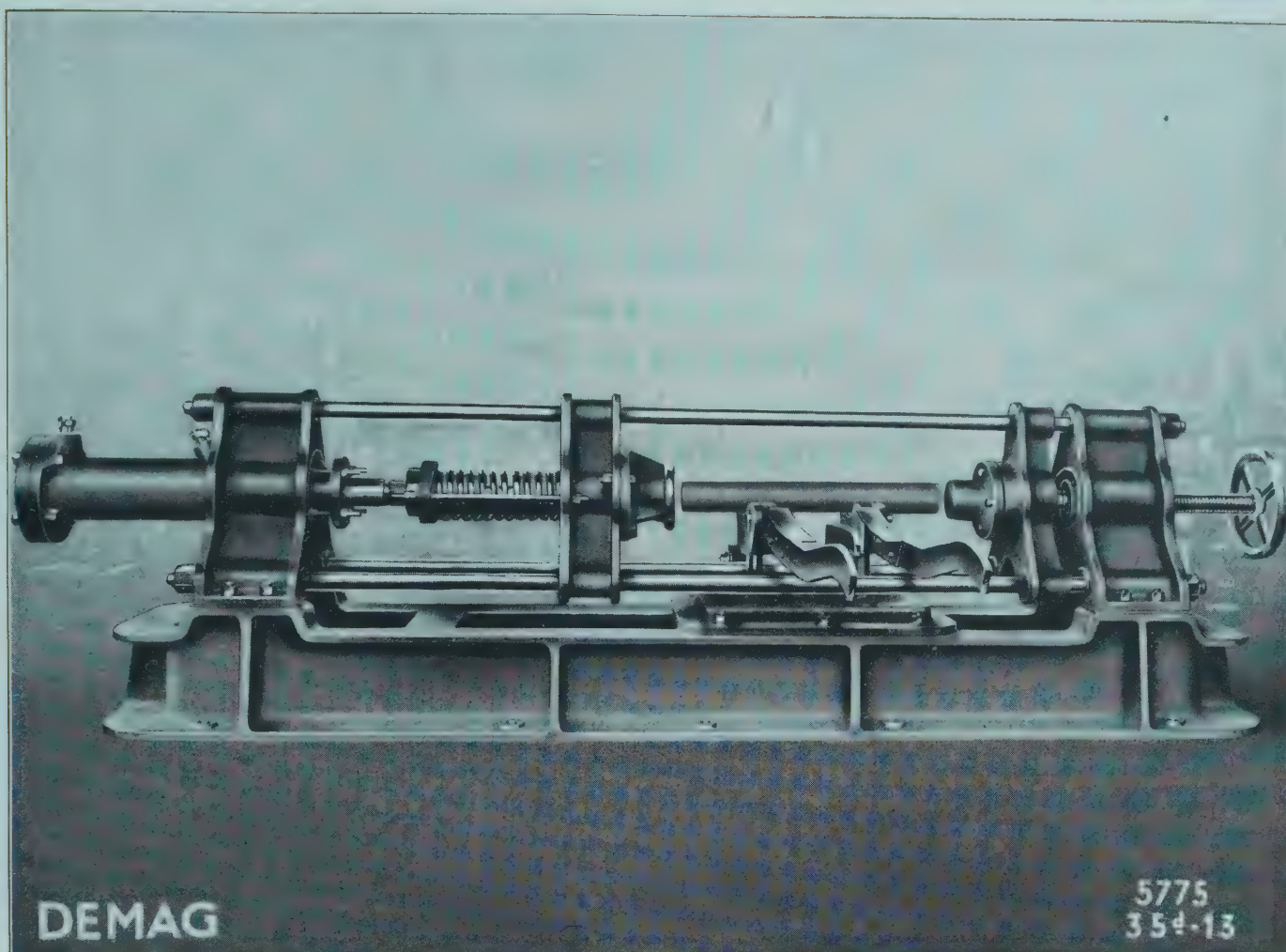




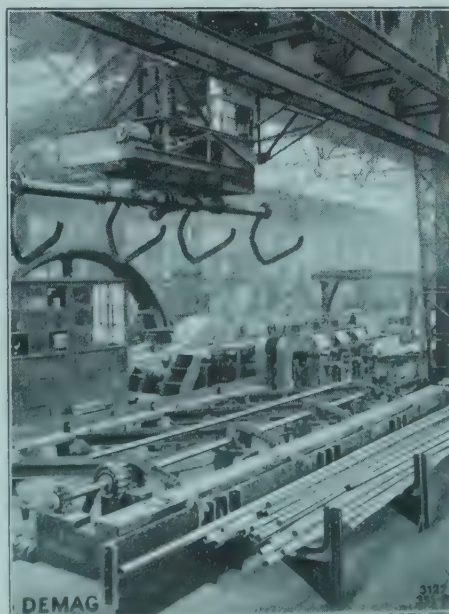
PNEUMATIC TUBE PUSHER AND TILTER FOR TWO-HIGH TUBE ROLLING MILLS, WITH ELECTRIC DRIVE







PNEUMATIC OR HYDRAULIC DEVICE FOR CENTERING THE INGOTS WHILE WARM



CONTINUOUS TUBE  
ROLLING MILL  
WITH CLAW CRANE

FOR THE RAPID  
TRANSPORT OF  
LONG TUBES



# ROLLING MILLS F. WELDED AND CORRUGATED TUBES

**T**he production of welded tubes is subdivided into three main groups, viz., for butt welded tubes from  $\frac{1}{8}$ " to 2" in diameter and the usual trade lengths of 6 metres, for lap welded tubes of  $1\frac{1}{2}$ " to 16" diameter and lengths of 8 metres – in this kind of tubes the whole strip is heated in the welding furnaces – and for lap welded tubes welded with water gas, 300 mm. to 3000 mm. in diameter and in lengths up to 10 metres. These three main groups are treated more in detail and in a clear and intelligible manner in the following sections A–C, the mode of production and the uses to which the various products are put being briefly explained.

## A) BUTT WELDED TUBES

**T**he tubes known as gas piping are mostly butt welded and are placed on the market in diameters ranging from  $\frac{1}{8}$ " to 2". They are made of hoop iron, of so-called pipe strips. The latter are raised to welding heat in a furnace and drawn through a funnel on a draw bench, the strip being thus given the shape of a tube, the joints being welded at the same time. Whilst still warm the tube is then passed through the calibrating rolling mill and through a straightening machine, the piping being given the exact diameter in the former and the latter carefully straightening it. The tube having been cooled on the cooling bed the ends are now cut off, and threaded if required. When finished the tube is subjected to a pressure test in order to test whether it is leaky.



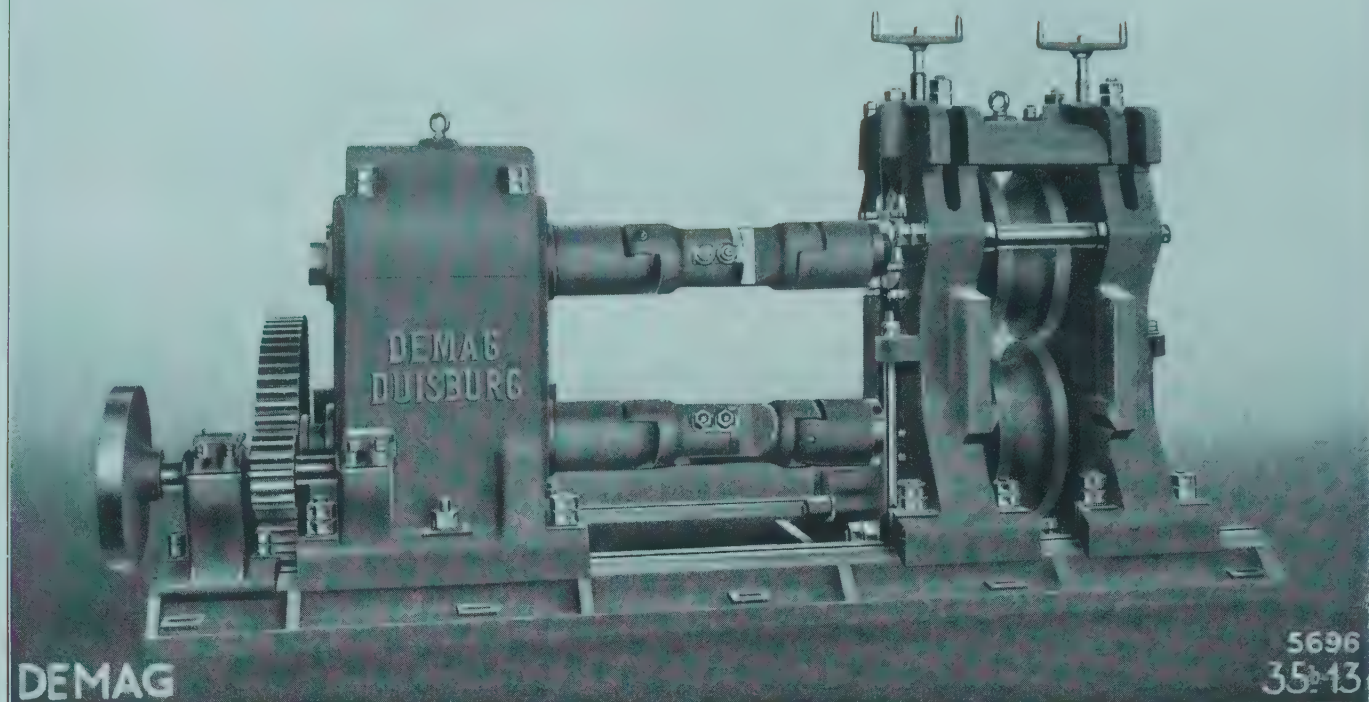
## B) LAP WELDED TUBES

**T**hese lap welded tubes are made of diameters ranging from  $1\frac{1}{2}$ " to 16". By means of a draw bench the strip of metal is first drawn through a round funnel whilst redhot, being thus given the shape of a tube. This rounded tube is then raised to welding heat in a welding furnace and rolled over a mandrel in a rolling mill with grooved rolls (welded tube rolling mill), during which process the edges of the metal are welded. Whilst still warm the tube is properly graduated and straightened in special rolling mills. When the waste ends have been removed from the tube it is worked into flanged, socket or bore pipes, tubular poles etc. Before leaving the workshops these tubes, too, are subjected to a water pressure test in the testing press to see whether they are leaky.

## C) TUBES LAP WELDED BY MEANS OF WATER GAS

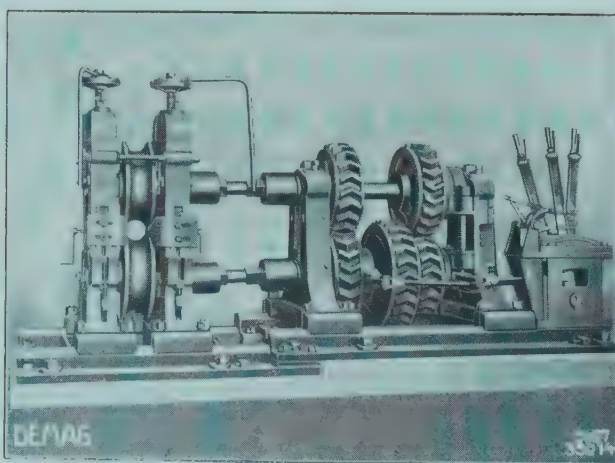
**T**hese tubes are made from a minimum diameter of 300 mm. to a maximum diameter of 3000 mm. The plates are rounded cold on a bending machine, the seam then being heated progressively by a small gas fire and welded with hammers. The hammering is generally done by pneumatic or steam rapid action hammers. When welded the tubes are annealed to remove any tension in the welded seam. They are then finally rounded on the bending machine. It must be noted that for all lap welded tubes the edges of the metal strips are chamfered, in order to avoid too great a thickness of metal when welding the edges which lie one above the other. These large tubes are used for gas and water conduits and for making corrugated tubes.



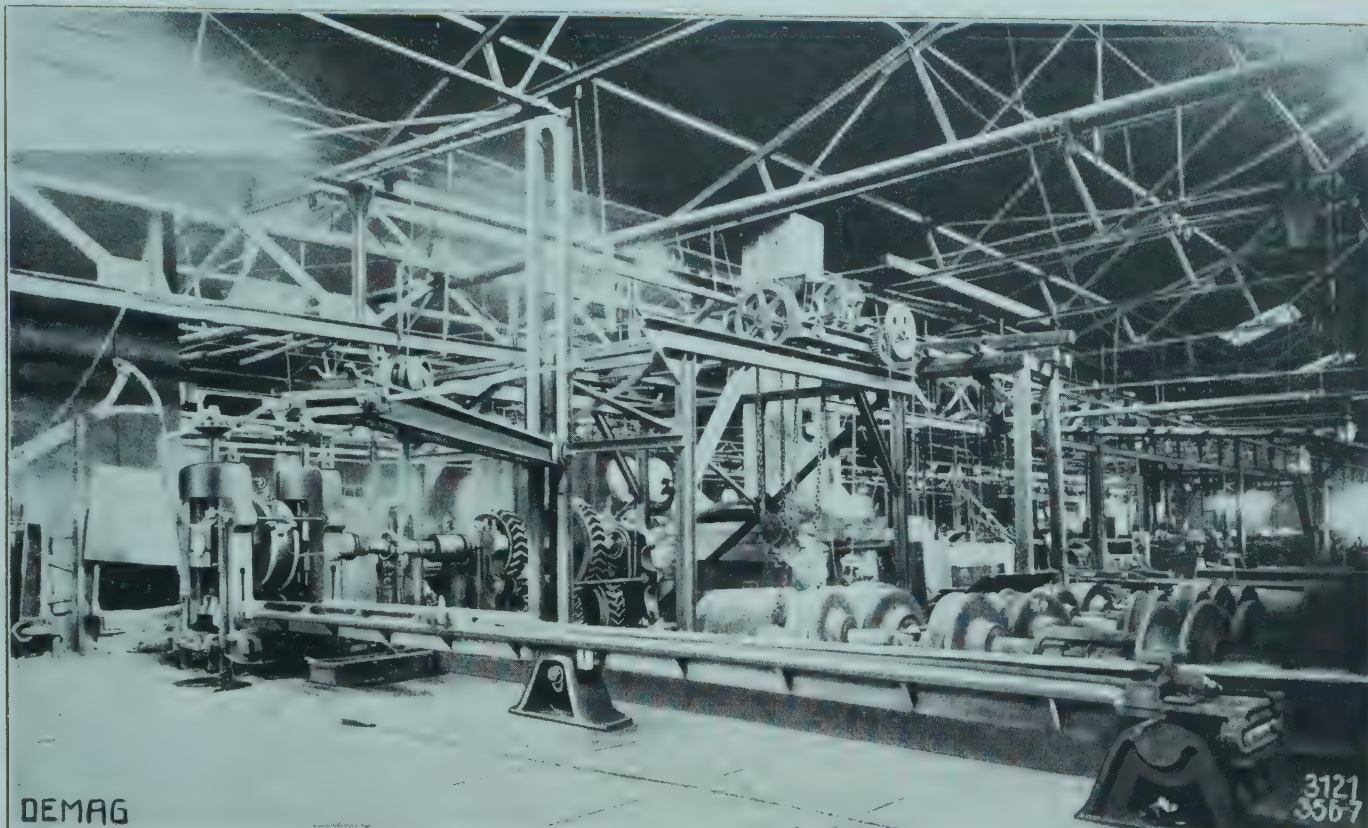


## ROLLING MILLS FOR WELDED TUBES

**T**hese Rolling mills may be driven either by a special motor or from a shaft lying beneath the rolling mill, the latter also driving the draw benches etc. for the plant. A charging machine erected behind the welding furnace pushes the cold tubes into the furnace and, when heated to welding heat, out of the furnace into the rolling mill. The rolling process lasts only a few seconds, so as to make the best use of the heat of the tube. The mandrel over which the tube is rolled is attached to a bar, which in its turn is secured at the back against springing out by means of a rod adjusting nut. After the rolling process the mandrel bar must be drawn backward to remove the tube.

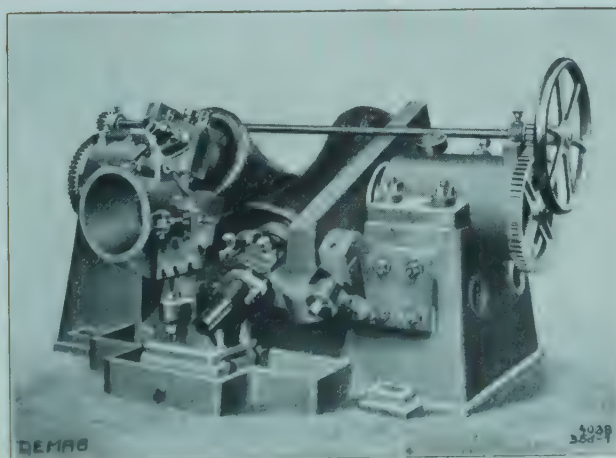






## ROLLING MILL FOR MAKING WELDED TUBES

**T**he electric rolling mill is erected immediately in front of the furnace and serves for making lap welded tubes up to 16" in diameter. After the rolling process the mandrel is removed by a bar with-drawing device attached to the machine, the tube cast out by a system of levers and, after passing through a calibrating rolling mill and a straightening machine, taken to the cooling bed or to the other finishing machines. The illustration below shows a tube straightening machine on which only warm tubes can be straightened. The inclined rolls impart to the tube a rotary motion and at the same time a progressive one. In spite of the peculiar shape of the rolls they are touched by the tube over their whole length.

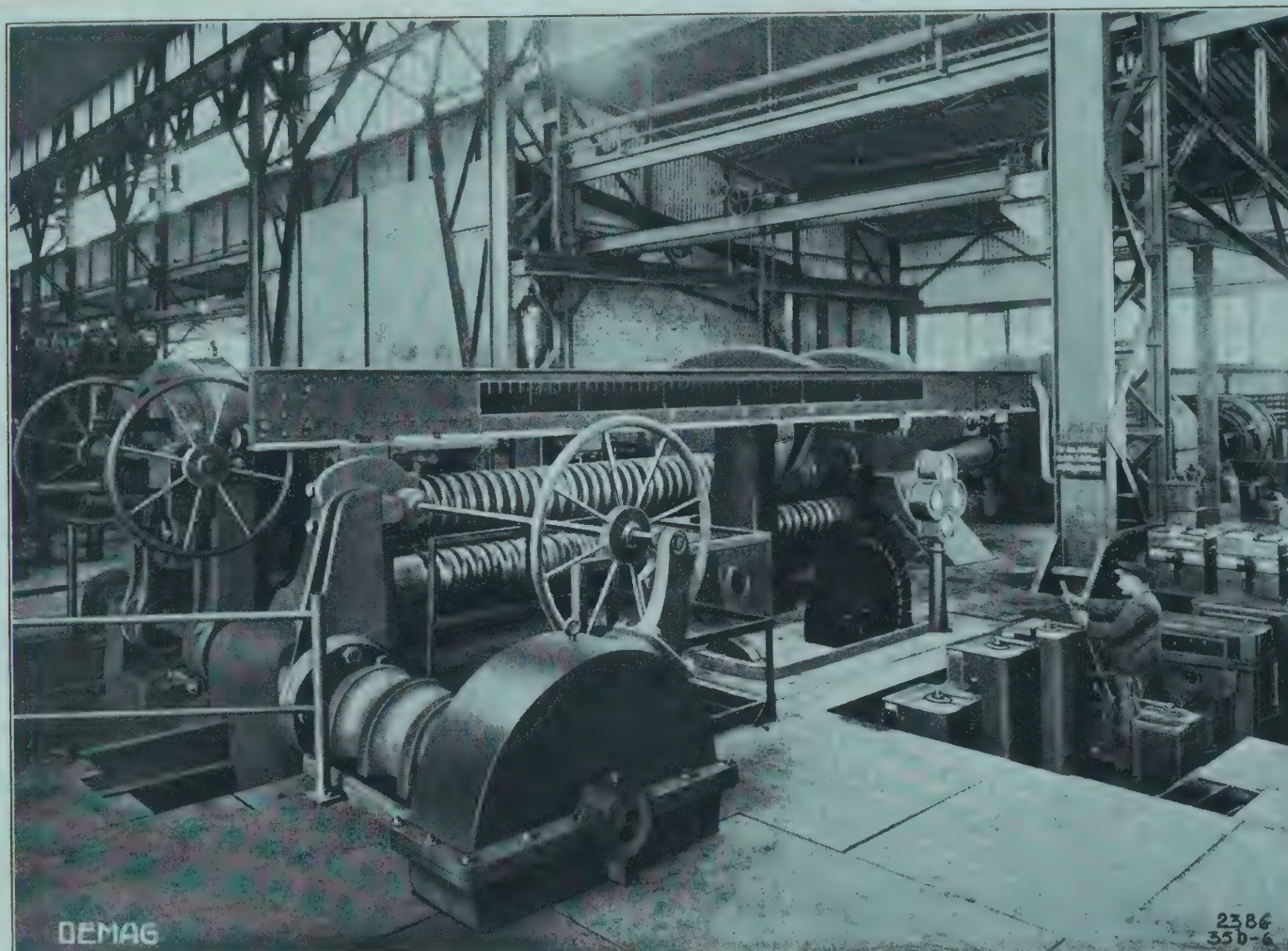




# ROLLING MILL FOR ROLLING CORRUGATED TUBES

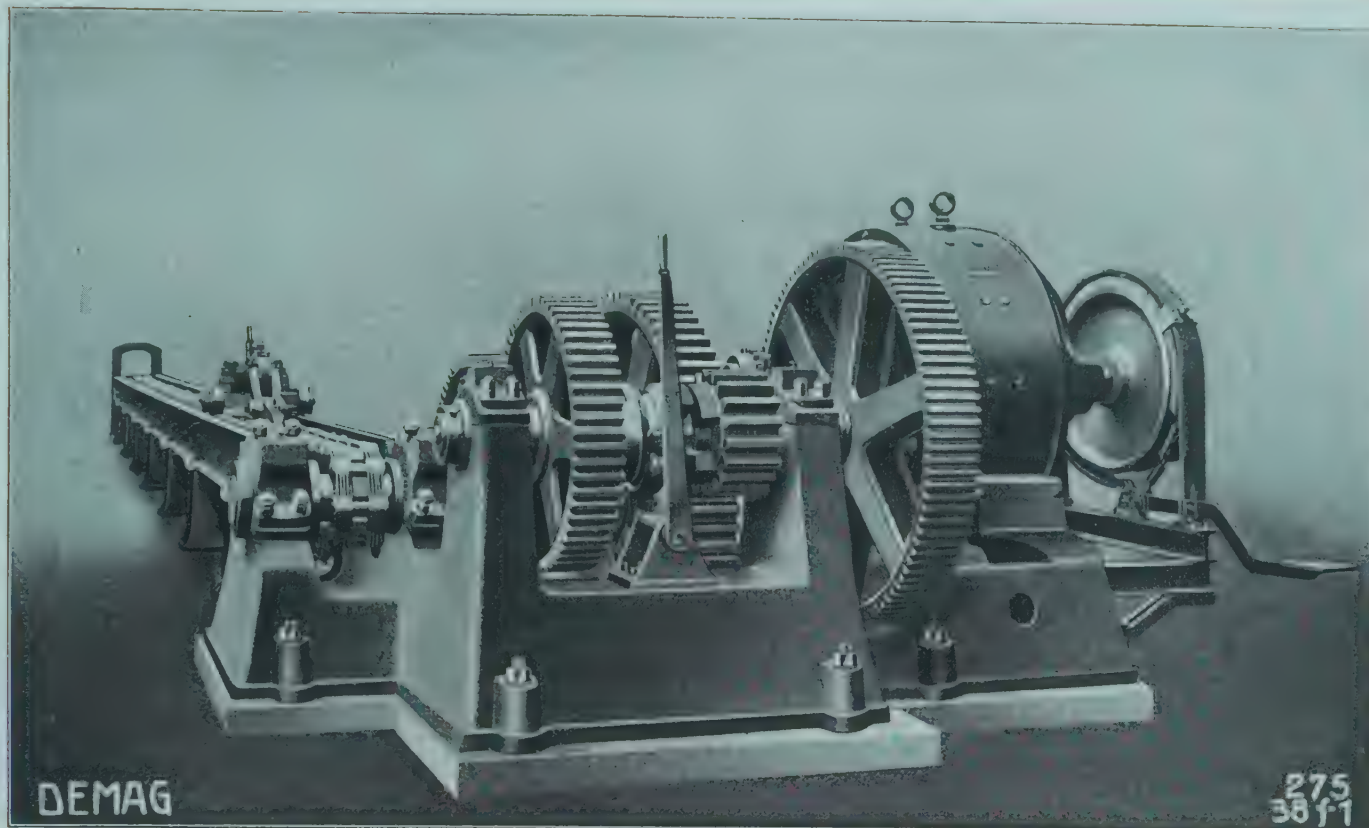
UP TO 6.5 m. IN LENGTH AND WITH AN INSIDE DIAM. OF 650 TO 2000 mm.

DELIV. FOR A. BORSIG, BERG- UND HÜTTENVERWALTUNG, BORSIGWERK,  
UP. SIL., AND FOR PHOENIX, AKTIEN-GESELLSCHAFT FÜR BERGBAU UND  
HÜTTENBETRIEB, DEPART.: HOERDER VEREIN, HOERDE IN WESTPHALIA

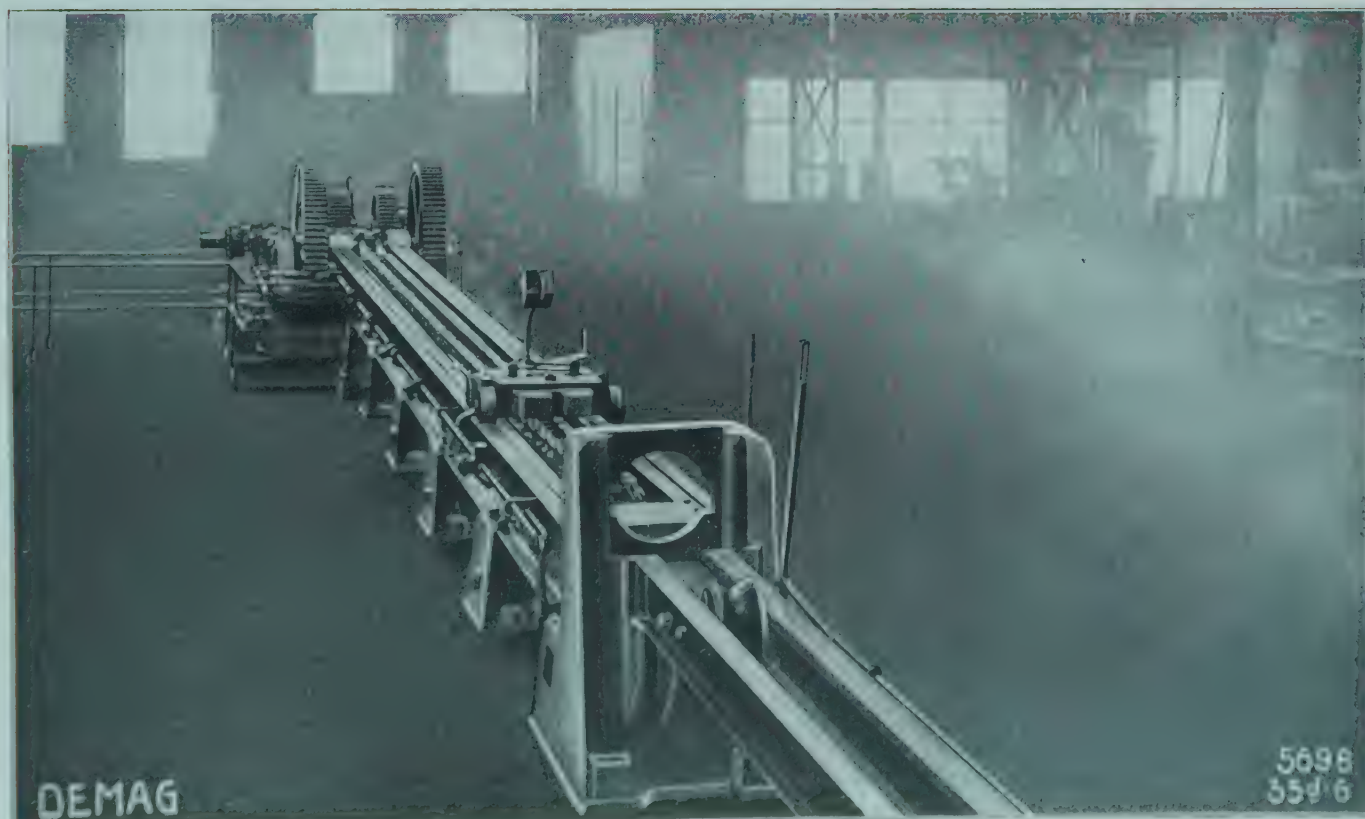


The corrugations are rolled into the finished smooth tubes whilst warm. The top roll is driven by a reversible motor with a normal output of 600 H. P. for 300 to 350 revs. and a gear ratio of 1 : 5. The bottom roll, the two side rolls and the stop plate are adjusted by electromotors controlled from one common platform. Suitable indicators help the attendant and secure a correct and exact product.

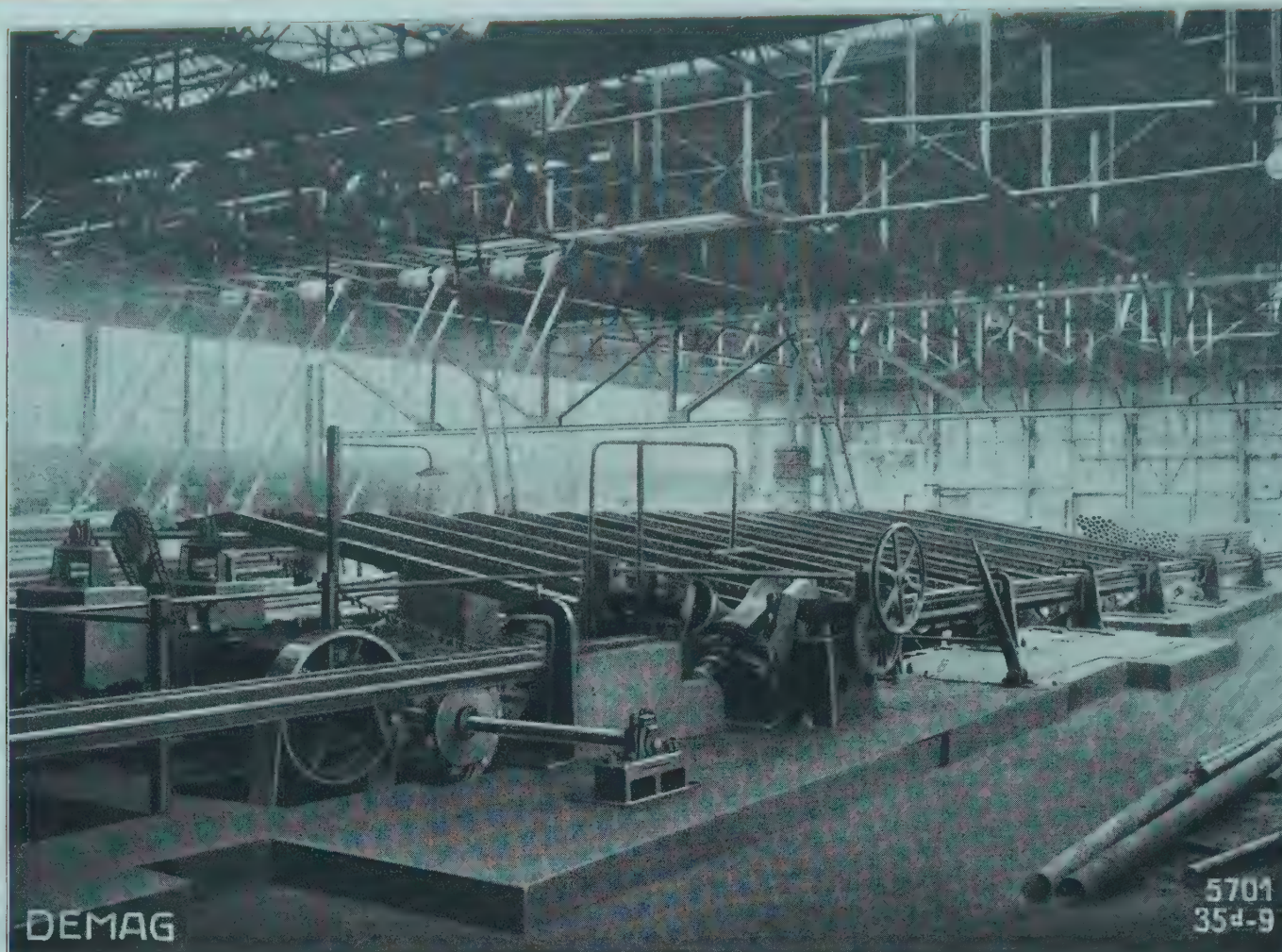




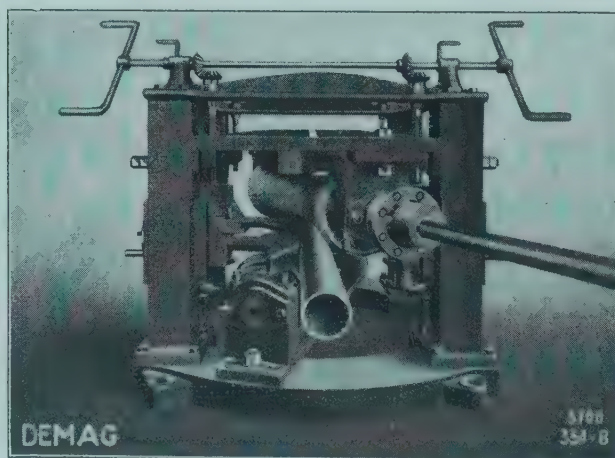
ELECTRIC DRAWING BENCHES ERECTED IN  
OUR ERECTING SHOP FOR MAKING TUBES







The above illustration shows a tube remover with tube straightening machine in the foreground, delivered to the Storsfors Bruks Aktiebolag, Storsfors (Sweden), the lower one a straightening machine in which the rolls lie one above the other, for straightening tubes ranging in diameter from 5" to 14".







These two illustrations show the finishing of tubes in a large Rhenish-Westphalian metallurgical works, with an electric loading crane for tubes also made by us. For this firm we have delivered several special cranes for tube conveying.



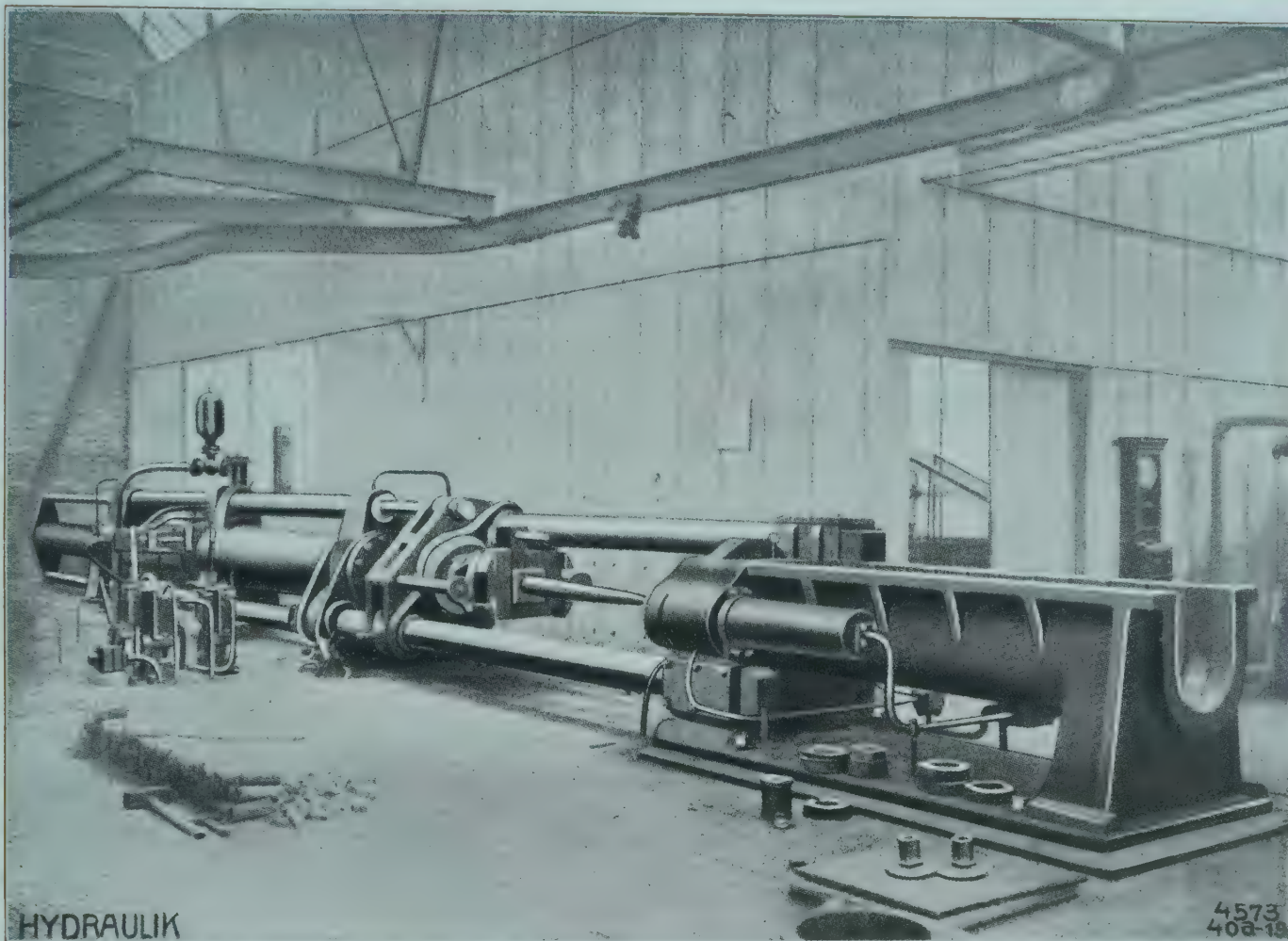


# HYDRAULIC PRESSES FOR MAKING AND FINISHING TUBES AND OTHER HOLLOW OBJECTS

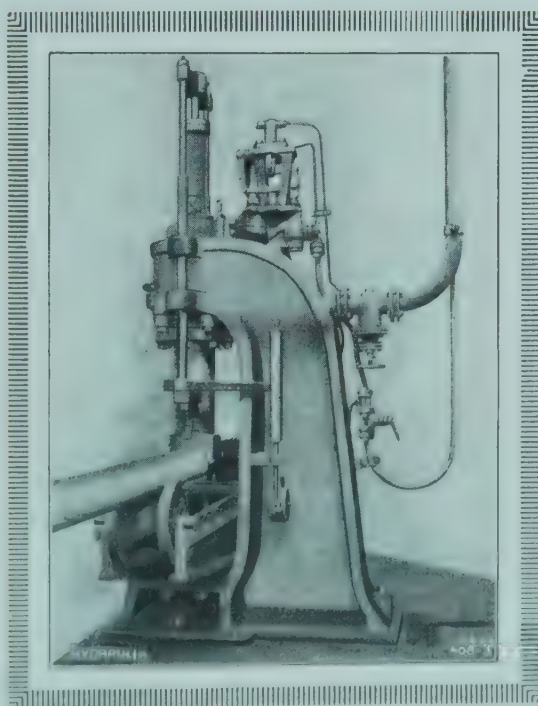
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**F**or making seamless tubes and other hollow objects not only tube rolling mills but also horizontal and vertical hydraulic presses are frequently employed. Vertical presses are used mostly for perforating the ingots, whereas horizontal presses are used for the real pressing or drawing of the ingots after they have been fore-bored. We deliver all the hydraulic machines needed in the tube industry, after the constructions of our branch establishment, the Hydraulik G. m. b. H. in Duisburg, such as pig bloom breakers, horizontal and vertical fore-boring presses, drawing presses and drawing benches, calibrating presses, mandrel withdrawing presses and tube ejectors, boiler tube presses, pipe bending presses and pipe pressure test mechanisms. The chief advantages of our tube presses and other hydraulic machines as compared with other systems lie in the much higher speeds of the plunger and the working speeds, the greater economy as regards the consumption of power water, and the ease with which they can be attended to, as well as simplicity of construction. We also refer to our special prospectuses on this branch of manufacture.





HIGH SPEED DRAWING PRESS WITH 4 m. STROKE FOR  
DRAWING TUBES AND OTHER HOLLOW OBJECTS



TUBE STRAIGHTENING  
AND BENDING MACHINE

LARGE NUM-  
BERS MADE



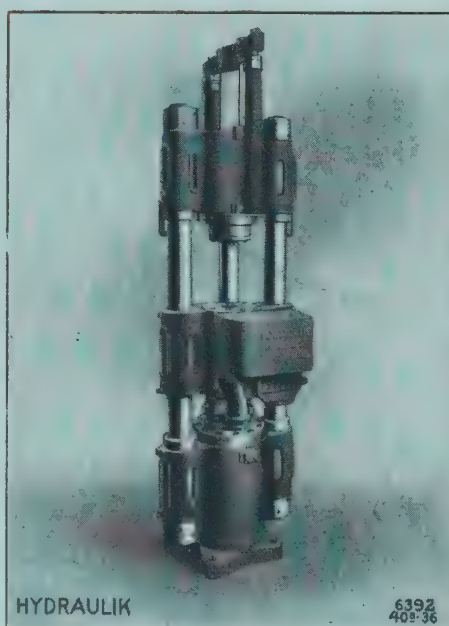


**H E A V Y T W O - S T A G E D R A W I N G P R E S S**  
 FOR DRAWING TUBES UP TO 500 mm. IN DIAMETER AND 2.5 m.  
 IN LENGTH, AS WELL AS PROJECTILES FOR THE LARGEST BORE

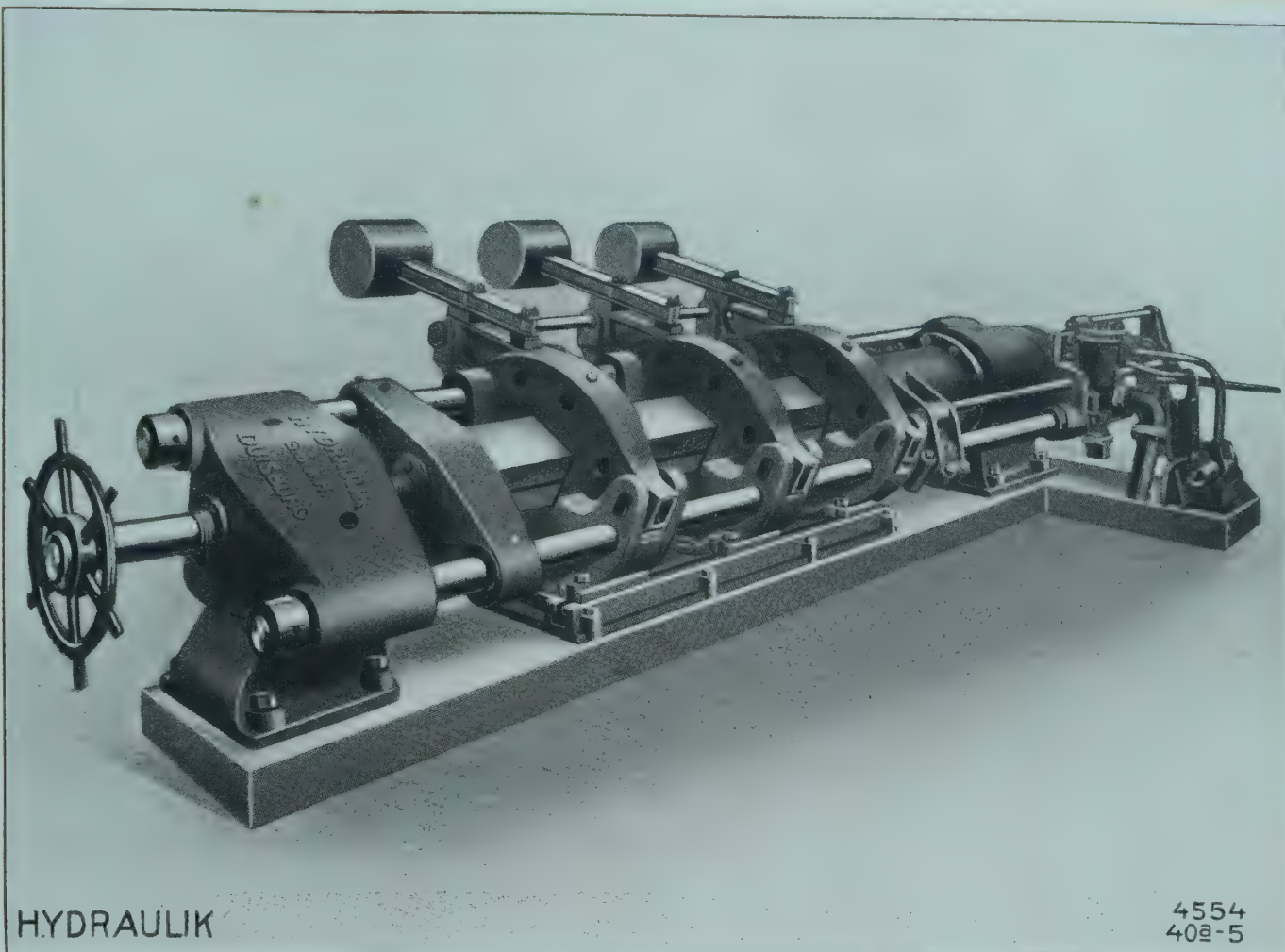
### **HYDRAULIC LEAD PIPE PRESS – HUBER SYSTEM**

Improved construction. Some of its advantages are: Strong mandrel bar for all dimensions of tubes, very short mandrel, which prevents side play, so that a tube is obtained with perfectly uniform walls, exact centring of the mandrel in the matrix, powerful construction, ease with which the matrix and

the mandrel can be changed. Only the most suitable material used.

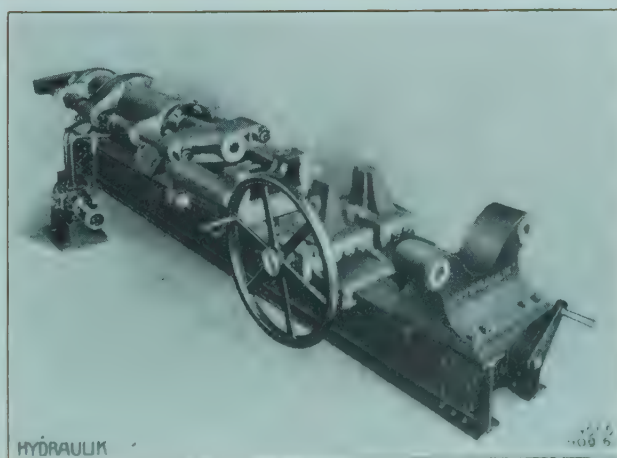




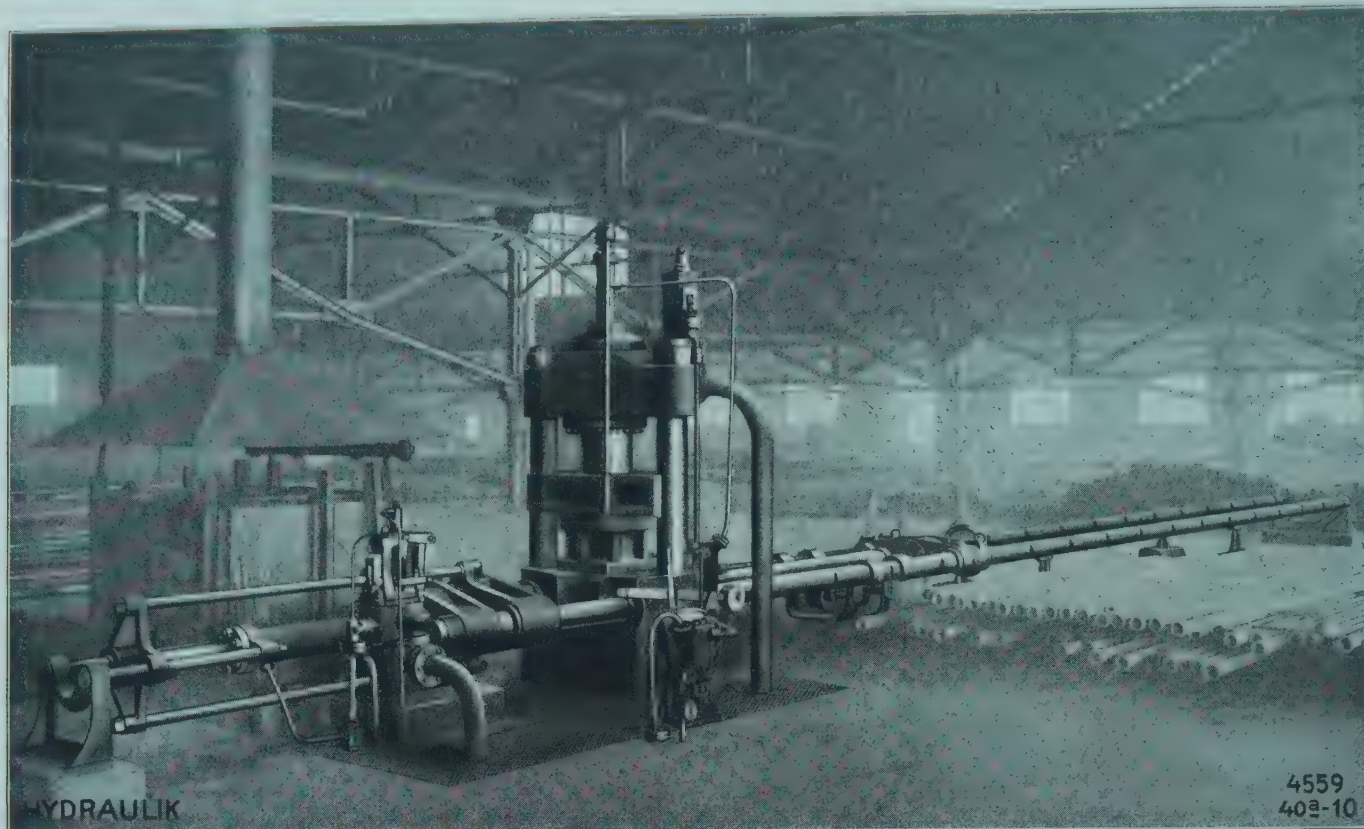


HYDRAULIC MANDREL UPSETTING PRESS  
FOR MANDRELS UP TO 3500 mm. IN LENGTH LARGE NUMBERS MADE

HYDRAULIC BOILER PIPE PRESS FOR EXPANDING,  
REDUCING AND CALIBRATING BOILER PIPES



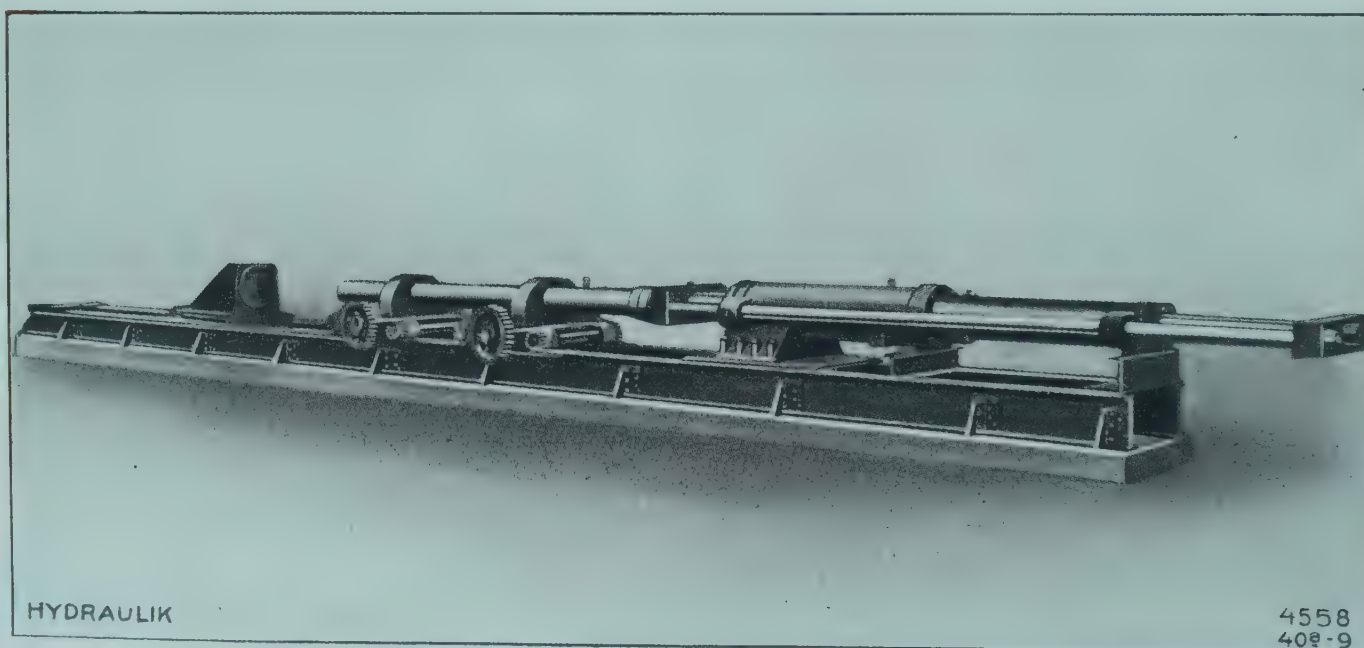




## PIPE UPSETTING PRESS FOR HYDRAULIC PRESSURE

The press illustrated above serves for upsetting, reducing and expanding tubes, welding joints etc. Upwards of 30 such presses have been delivered to the leading tube works of Europe in the course of 6 or 7 years.

## HYDRAULIC CALIBRATING PRESS FOR EXPANDING REDUCING AND CALIBRATING TUBES



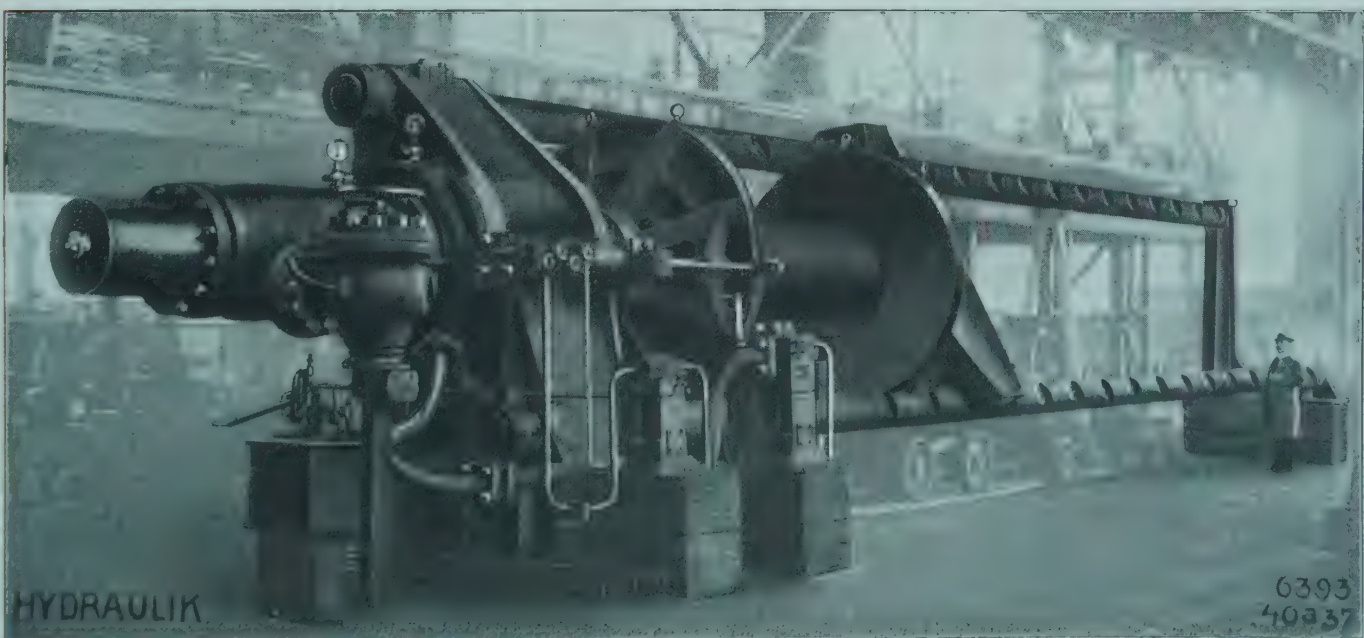




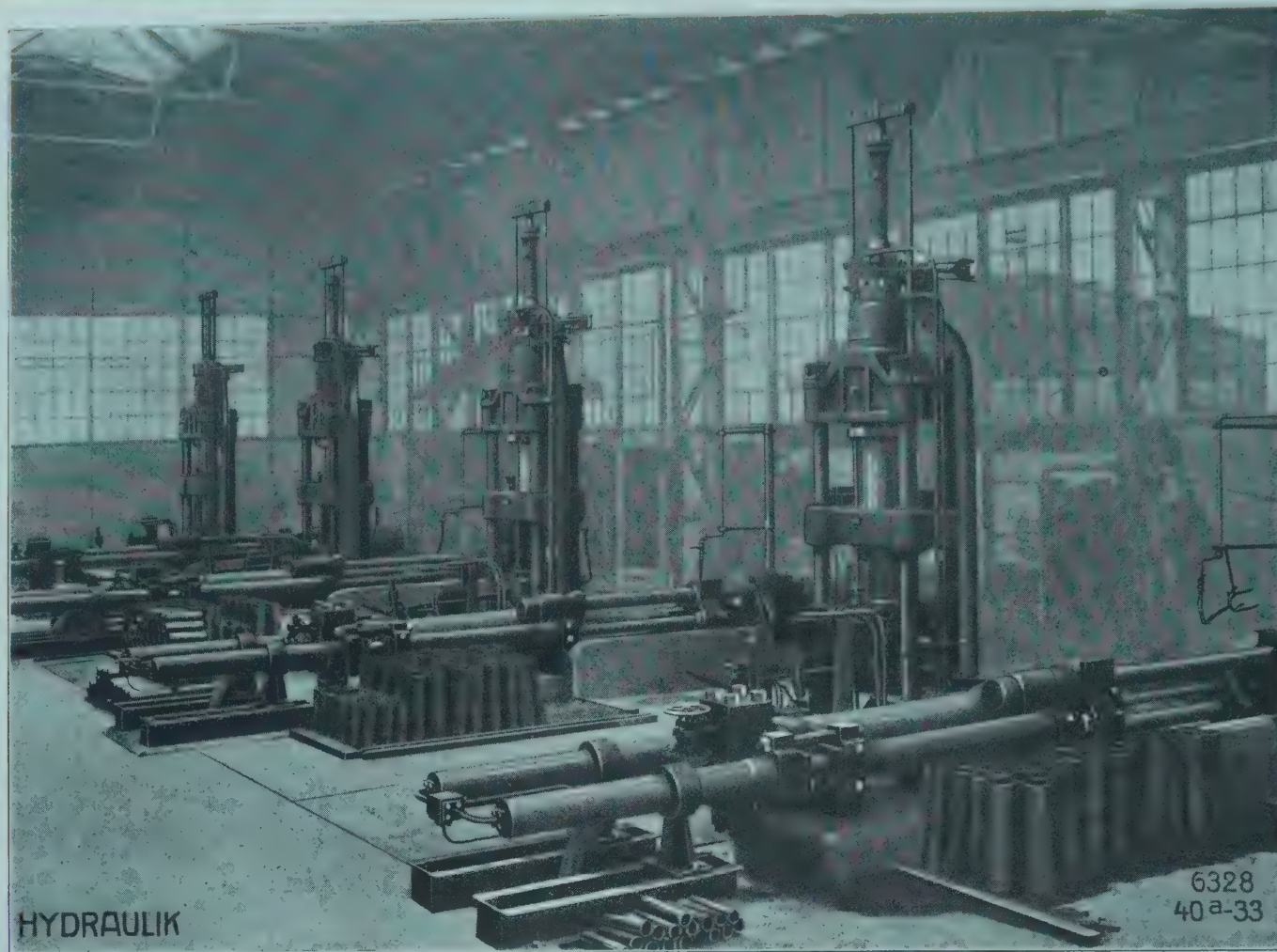
## HYDRAULIC PIPE PRESSURE TEST MECHANISM

The hydraulic pipe pressure test mechanisms illustrated on this page are the latest and most completely equipped types for testing tubes up to 2 m. in diameter and 20 m. in length for inner pressure.

## HYDRAULIC PIPE PRESSURE TEST MECHANISM SUBSTANTIAL CONSTRUCTION / SEVERAL MADE





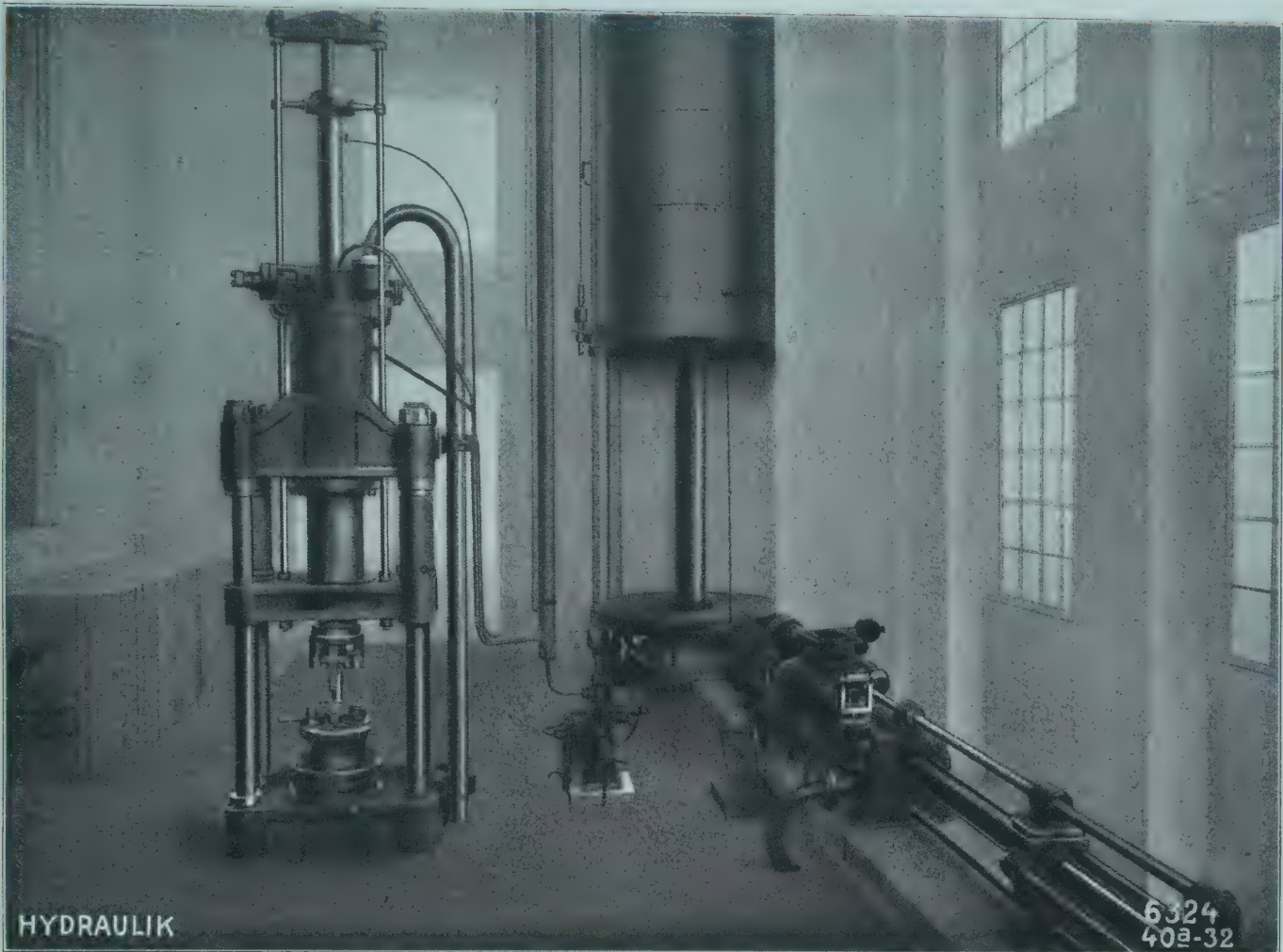


## FOURFOLD PRESS PLANT FOR MAKING PROJECTILES / LARGE NUMBERS MADE

Horizontal drawing press and vertical boring press for making  
hollow objects of small diameter.







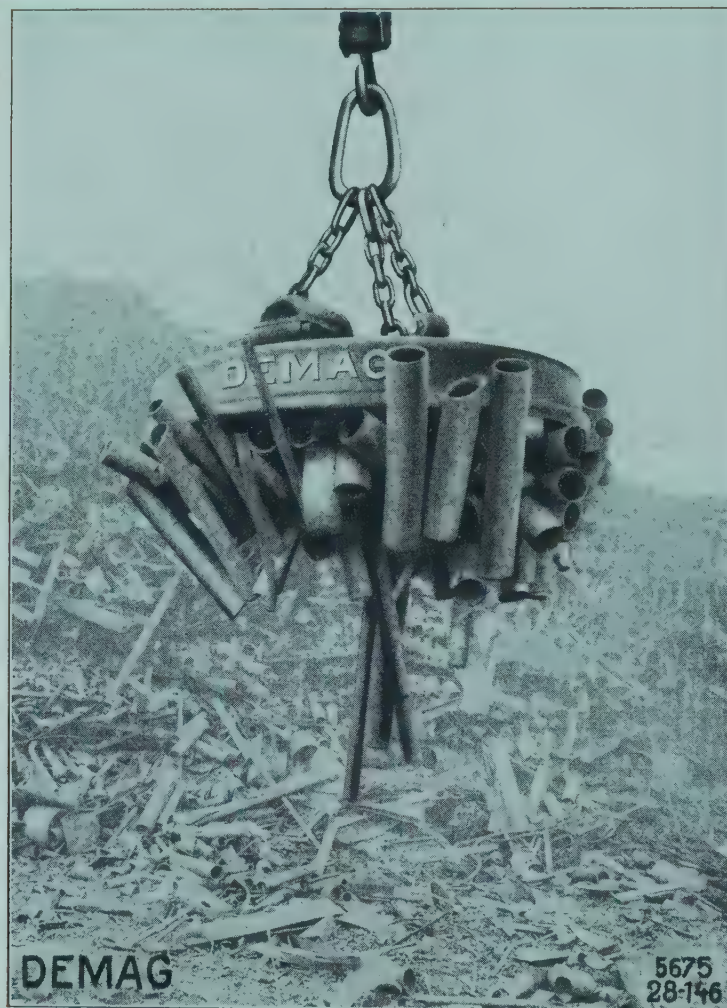
COMPLETE PLANT FOR MAKING THE SHELLS  
FOR SHRAPNELLS / SMALL TYPE

Hydraulic press plant for making projectiles and  
hollow objects. Large type.





# DEMAG LIFTING MAGNET



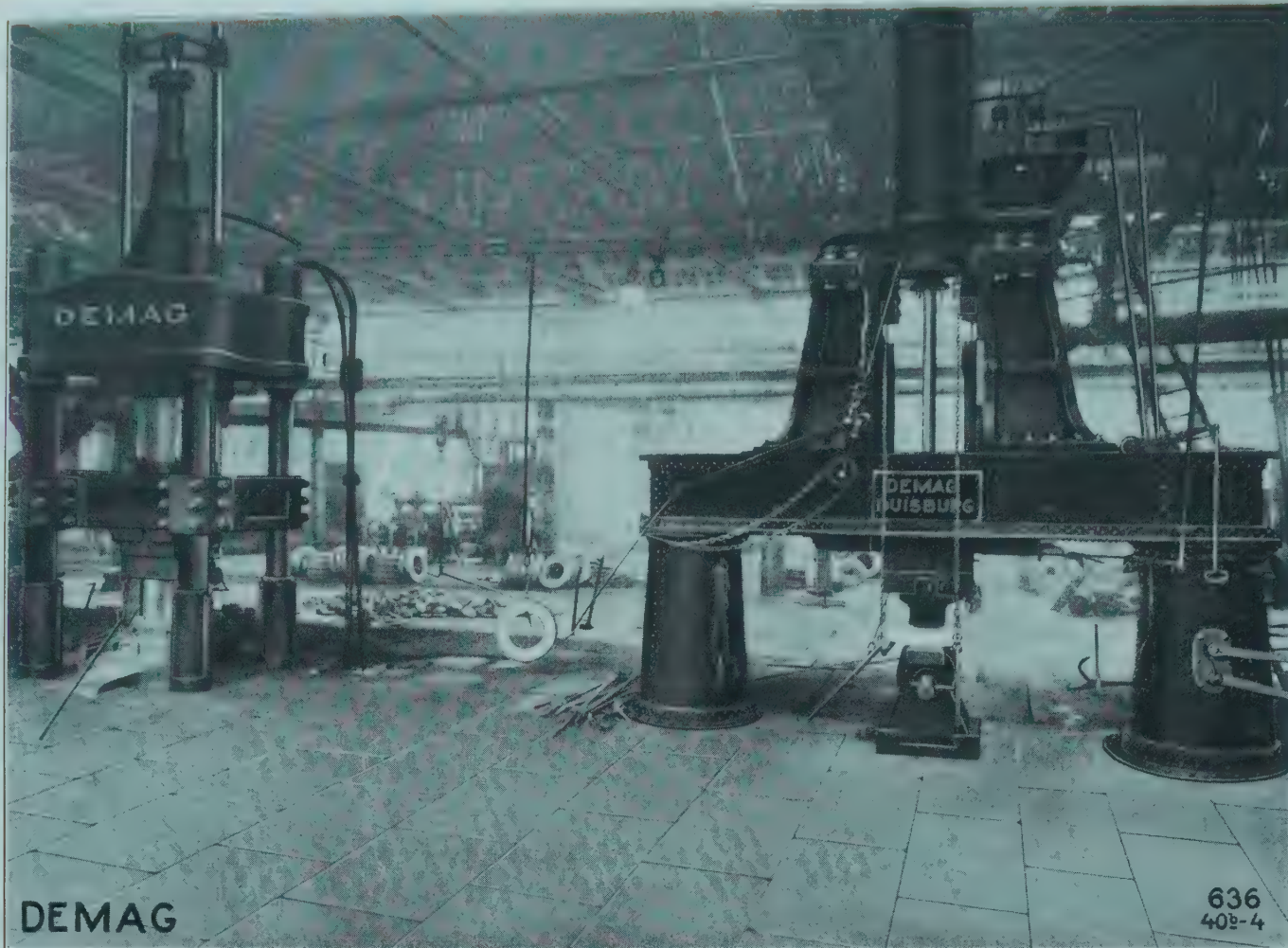
TRANSPORTING PIPE  
WASTE



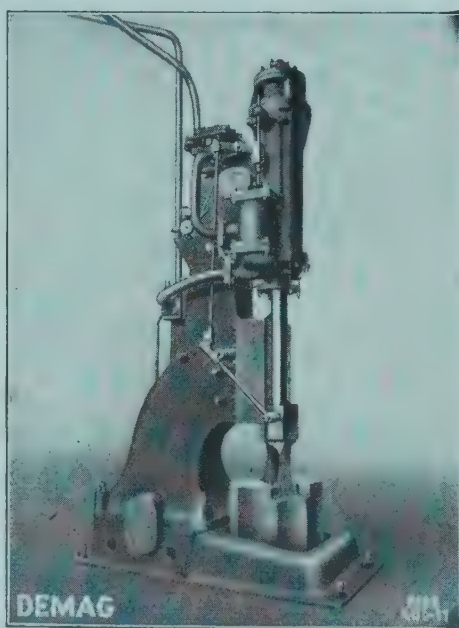


**I**n railway rolling stock the wheels are the most important part, as it is on these that the greatest strain is put. It is therefore absolutely necessary for the wheel to be unbreakable in all its parts and free from flaws, and for those parts endangered by wear and tear to possess the proper density and hardness to prevent them from wearing away quickly. The cast raw material for the production of tyres is mostly in the form of a bloom of square or polygonal cross-section, with one end rounded. It is heated to white heat in a heating furnace erected to suit the shape of the bloom, and then forged into thick discs under a hydraulic press or a steam hammer, after which it is punched. When punched, the material, which has now assumed the form of a ring, is conveyed to a second press or steam hammer, where it is expanded to the desired diameter on a mandrel. After being thus prepared the tyre returns to the furnace to be raised to the necessary rolling temperature and then rolled. The tyre mill itself consists in the main of a shaped roll, driven by a vertical shaft from a gear situated beneath the floor, and of a pressure roll revolving loose on a pivot, which presses the tyre against the above-mentioned working roll by means of hydraulic power. At the sides of the working roll there are two other rolls, also shaped, that serve as a guide for the tyre. These rolls are adjusted by hand or by electricity little by little, according to the increasing diameter of the tyre. An indicator which shows the diameter is built into the rolling mill. This device is often worked by the movable guide carriage which supports the pressure roll. The discs are made in a similar manner to the tyres. The cast raw blooms are heated in the furnace, hammered out under a press or the steam hammer, and rolled in a so-called wheel centre mill. The arched shape of the wheel is also obtained by a press or the steam hammer. A wheel centre mill can be driven either by a steam engine or by an electromotor. In both cases the adjustable conical working rolls are driven by spur wheel gear.





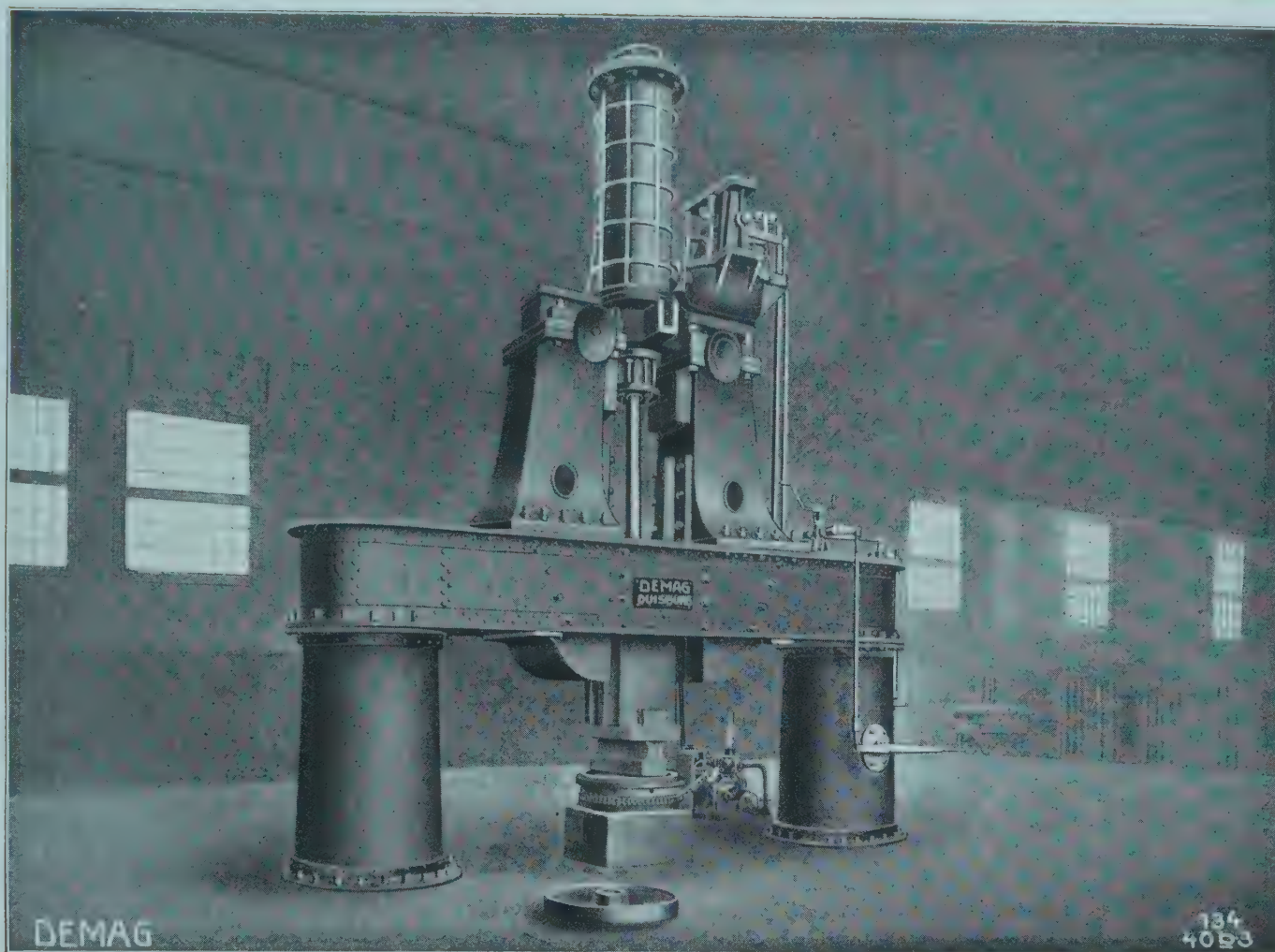
FORGING PRESS AND STEAM HAMMER FOR FORE-FORGING  
TYRES AND DISCS / "GUTEHOFFNUNGSHÜTTE", AKTIENVEREIN  
FÜR BERGBAU UND HÜTTENBETRIEB, OBERHAUSEN, RHINELAND



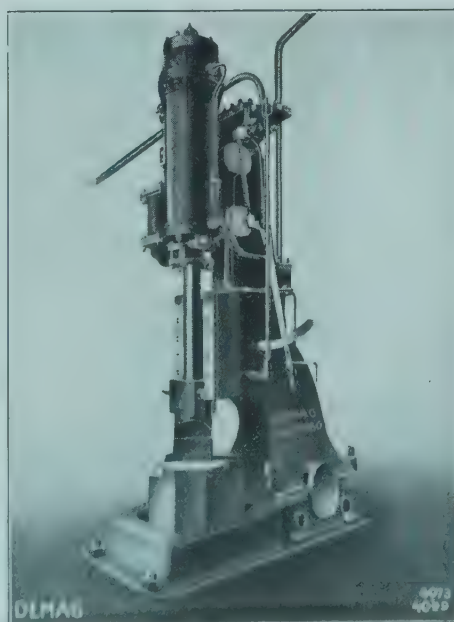
SINGLE STANDARD  
STEAM HAMMER

LARGE NUM-  
BERS MADE





DOUBLE STANDARD STEAM HAMMER FRAME, DROP ABOUT 6000 KILOS.,  
FOR FORE-FORGING DISCS / DELIVERED FOR THE STAHLWERKE  
VAN DER ZYPEN UND WISSENER EISENHÜTTEN-A.-G., COLOGNE-DEUTZ



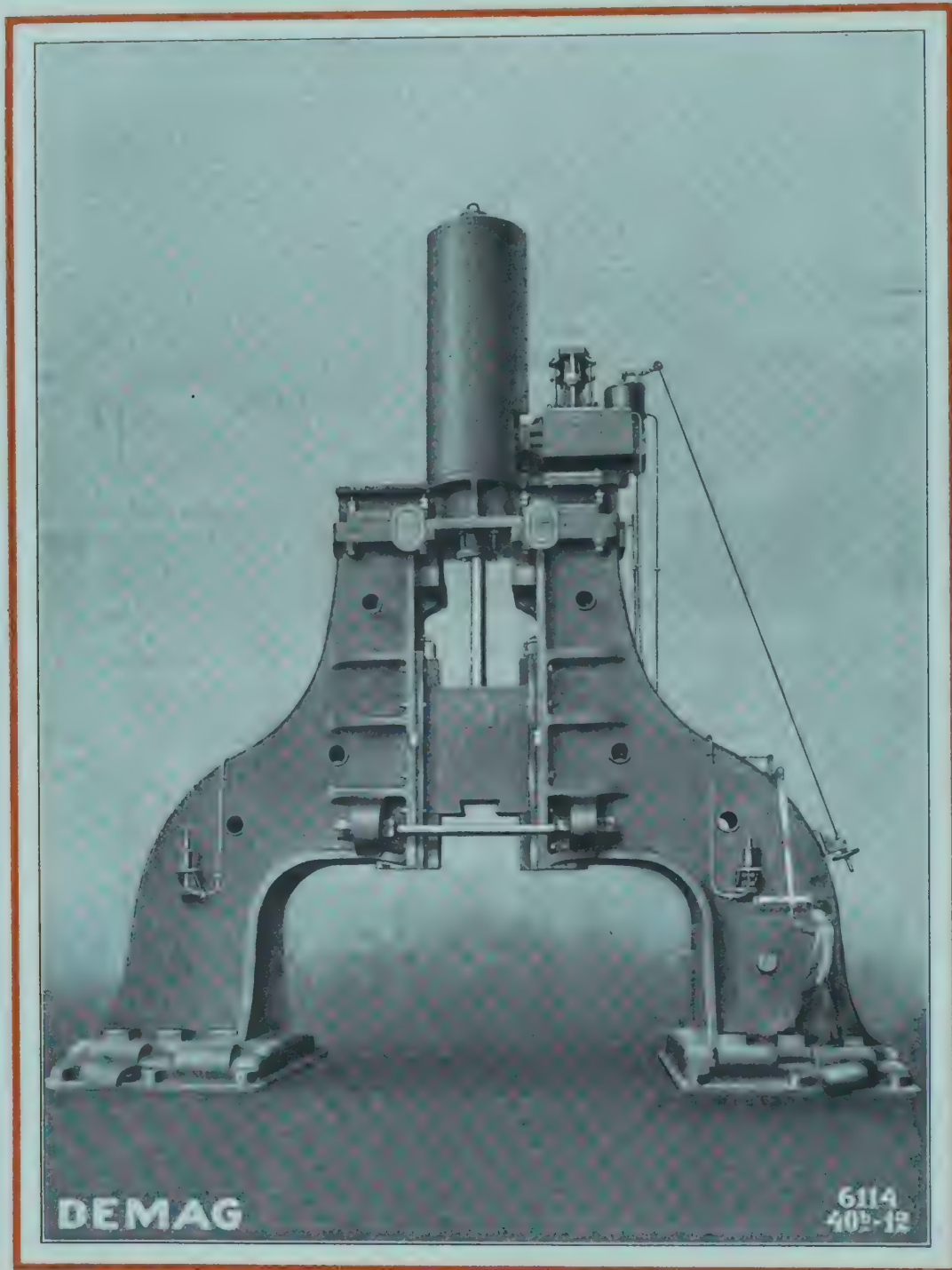
SINGLE STANDARD  
STEAM HAMMER

LARGE NUM-  
BERS MADE



# DOUBLE STANDARD STEAM HAMMER FRAME

DROP 10000 KILOGRAMMES, FROM A PHOTOGRAPH  
TAKEN IN OUR WORKSHOP

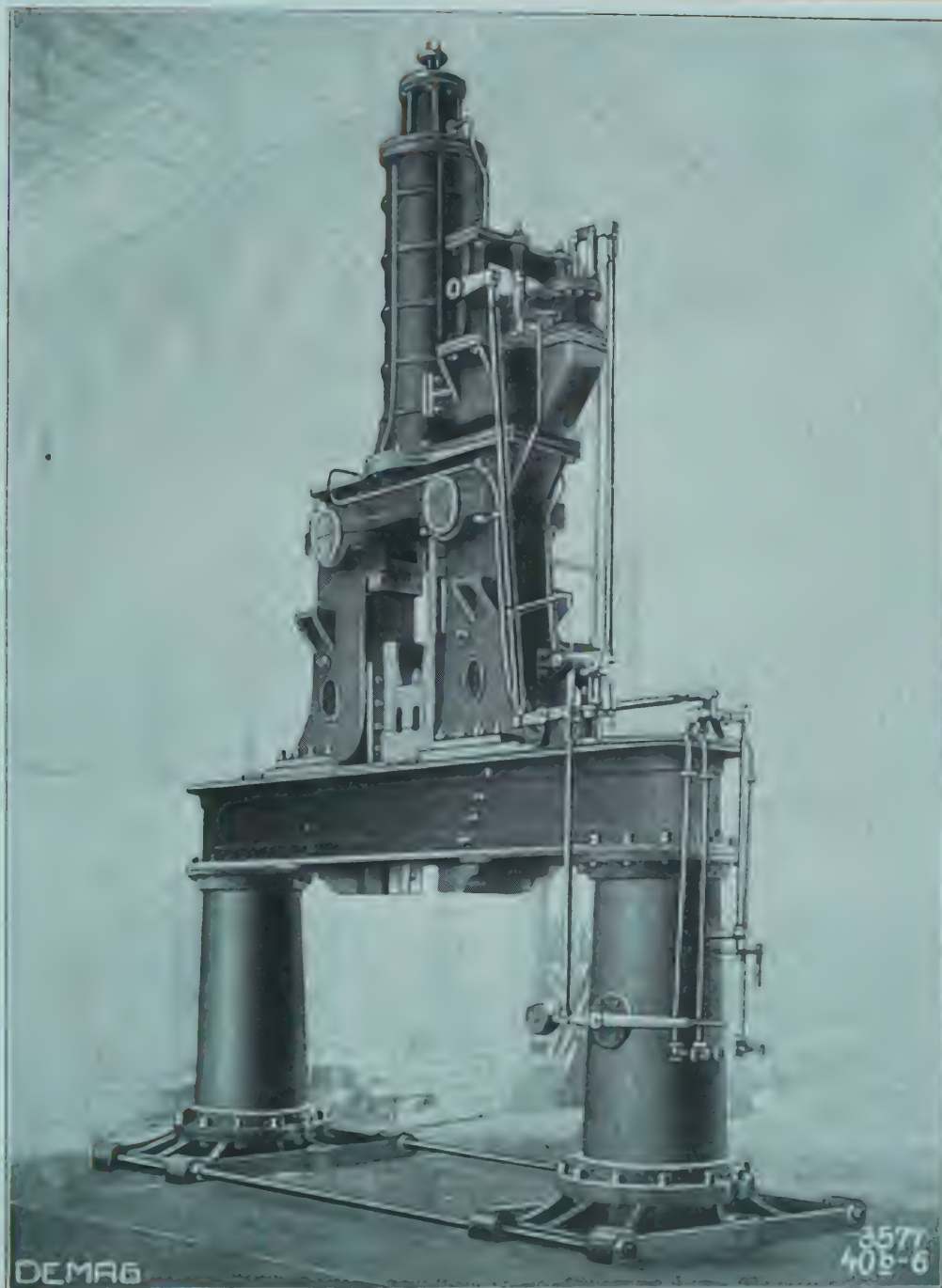


WE HAVE CONSTRUCTED DOUBLE STANDARD STEAM HAMMER FRAMES OF THE MOST VARIED SIZES UP TO 20000 KILOGRAMME DROP



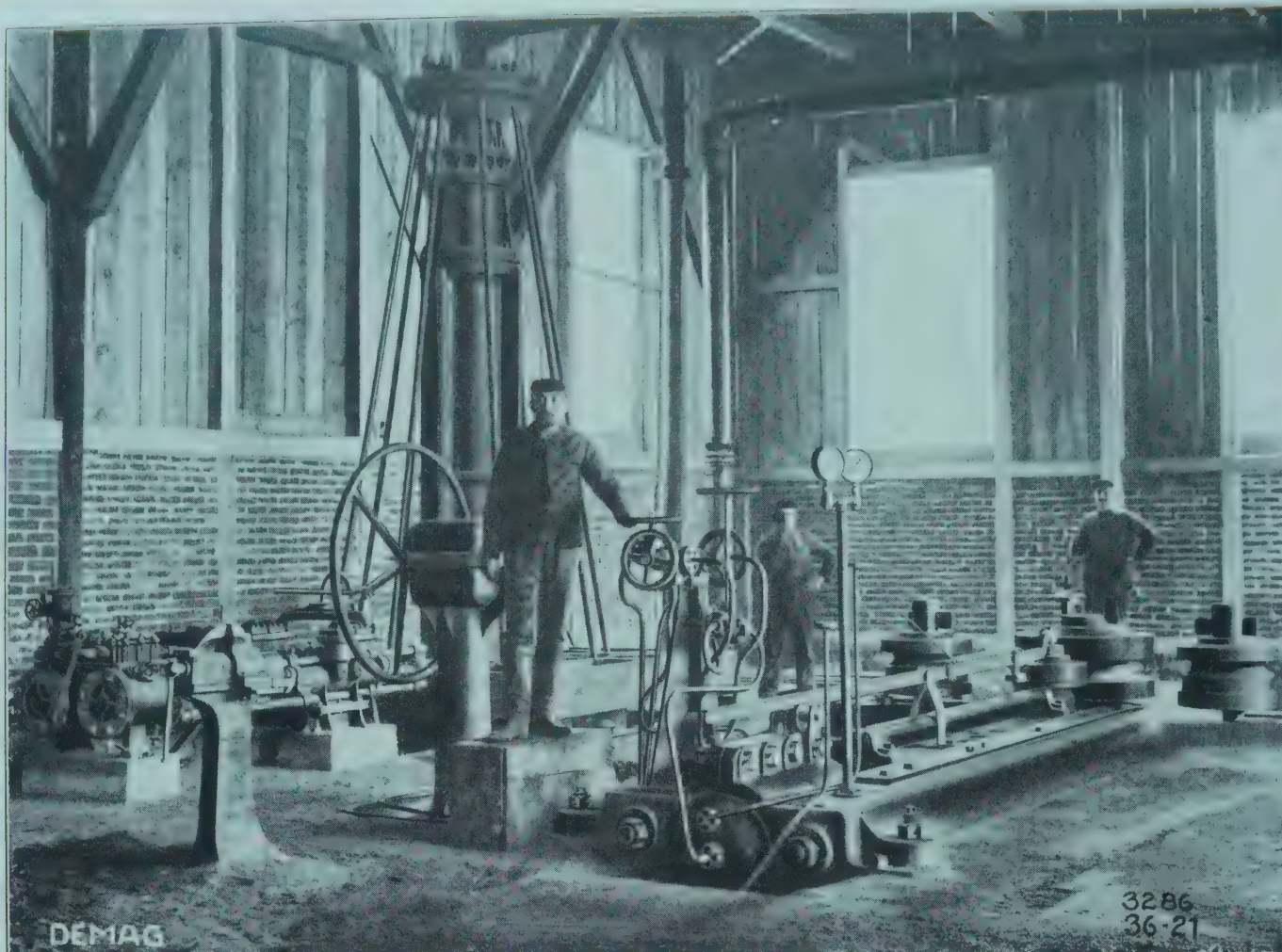
# DOUBLE STANDARD STEAM HAMMER FRAME

DROP 2500 KILOGRAMMES, FROM A PHOTOGRAPH  
T A K E N I N O U R W O R K S H O P



THIS HAMMER IS DRIVEN BY STEAM ADMITTED ABOVE  
AND BELOW THE PISTON, THE STEAM DISTRIBUTION IS  
EFFECTED BY BALANCED VALVES CONTROLLED BY HAND

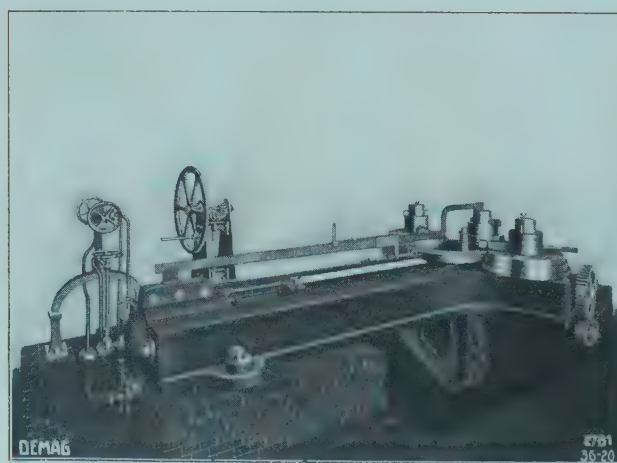




TYRE ROLLING MILL FOR TYRES UP TO 3000 mm. IN DIAMETER  
DELIVERED FOR THE A.-G. CHARLOTTENHÜTTE, NIEDERSCHULDEN (SIEG)

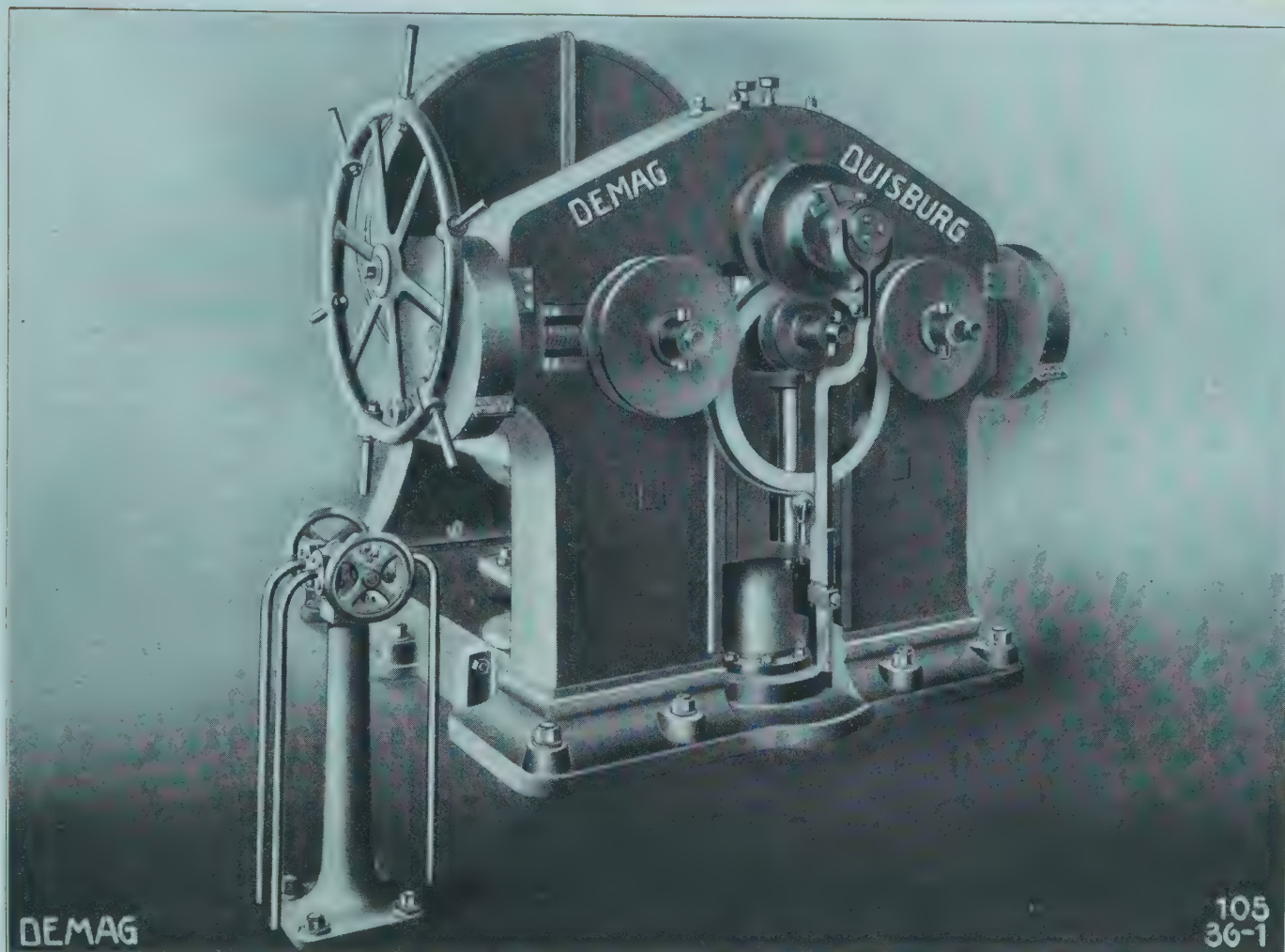
**T**he tyre rings are first fore-forged by hydraulic forging presses or steam hammers and then taken to the tyre mill on an aerial railway or by means of a crane, to be finished. The rolls are adjusted by hydraulic power and driven from below from a steam engine or an electromotor, by means of a vertical shaft and bevel wheels.

We deliver such  
plants complete  
with all accessories.



Large numbers  
made for firms at  
home and abroad.

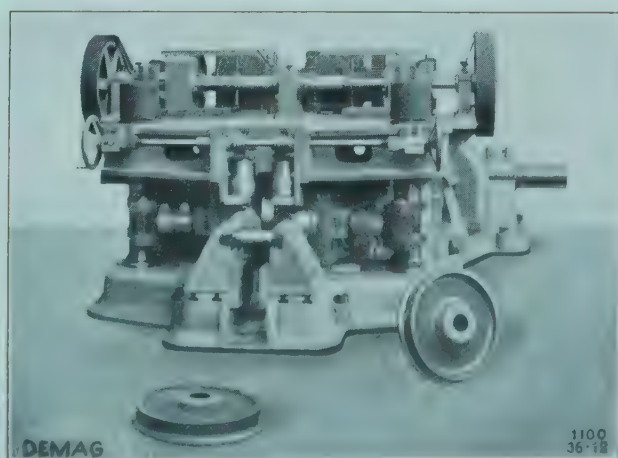




VERTICAL TYRE MILL FOR TYRES FOR NARROW GAUGE RAILWAYS, INSIDE DIAMET. OF THE TYRES 250 TO 1100 mm. / HULDSCHINSKYWERKE, GLEIWITZ

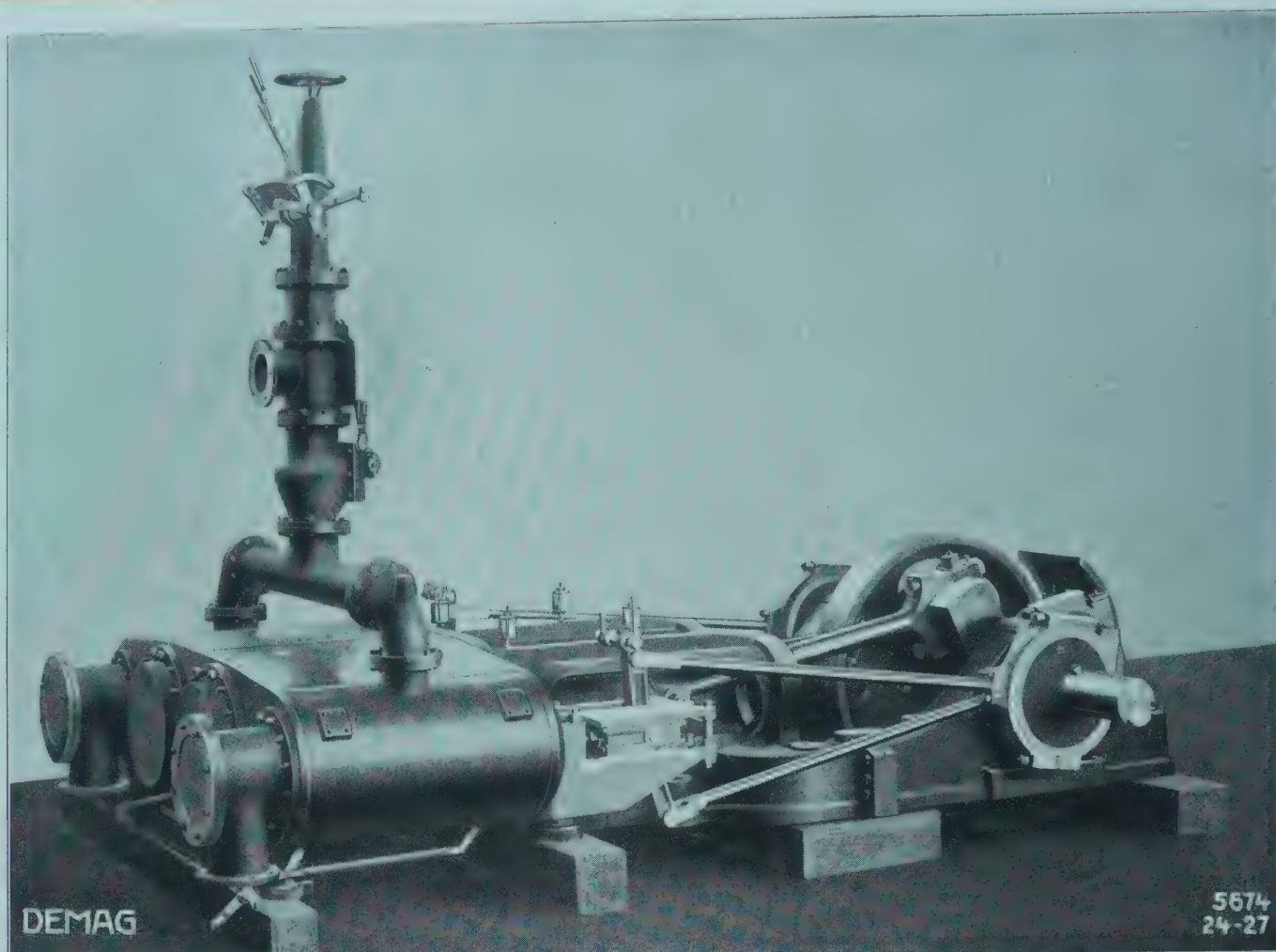
**T**he shaped roll which lies at the top is driven by electricity and, during the rolling process, carries with it the pressure roll that runs on the inside of the tyre and is adjusted by hydraulic power. The two guide rolls at the side are moved forward by hand. Delivered for the Oberschlesische Eisenbahnbedarfs-Aktiengesellschaft, Department: Huldskywerke, Gleiwitz, and others.

Old-fashioned  
disc mill.  
Delivered for a



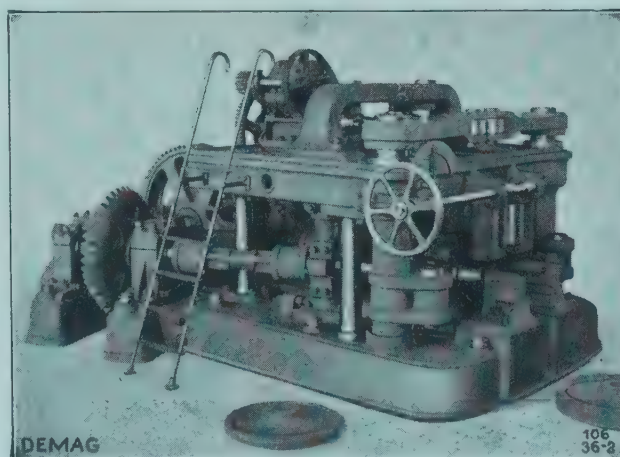
Rhenish-West-  
phalian metall-  
urgical works.



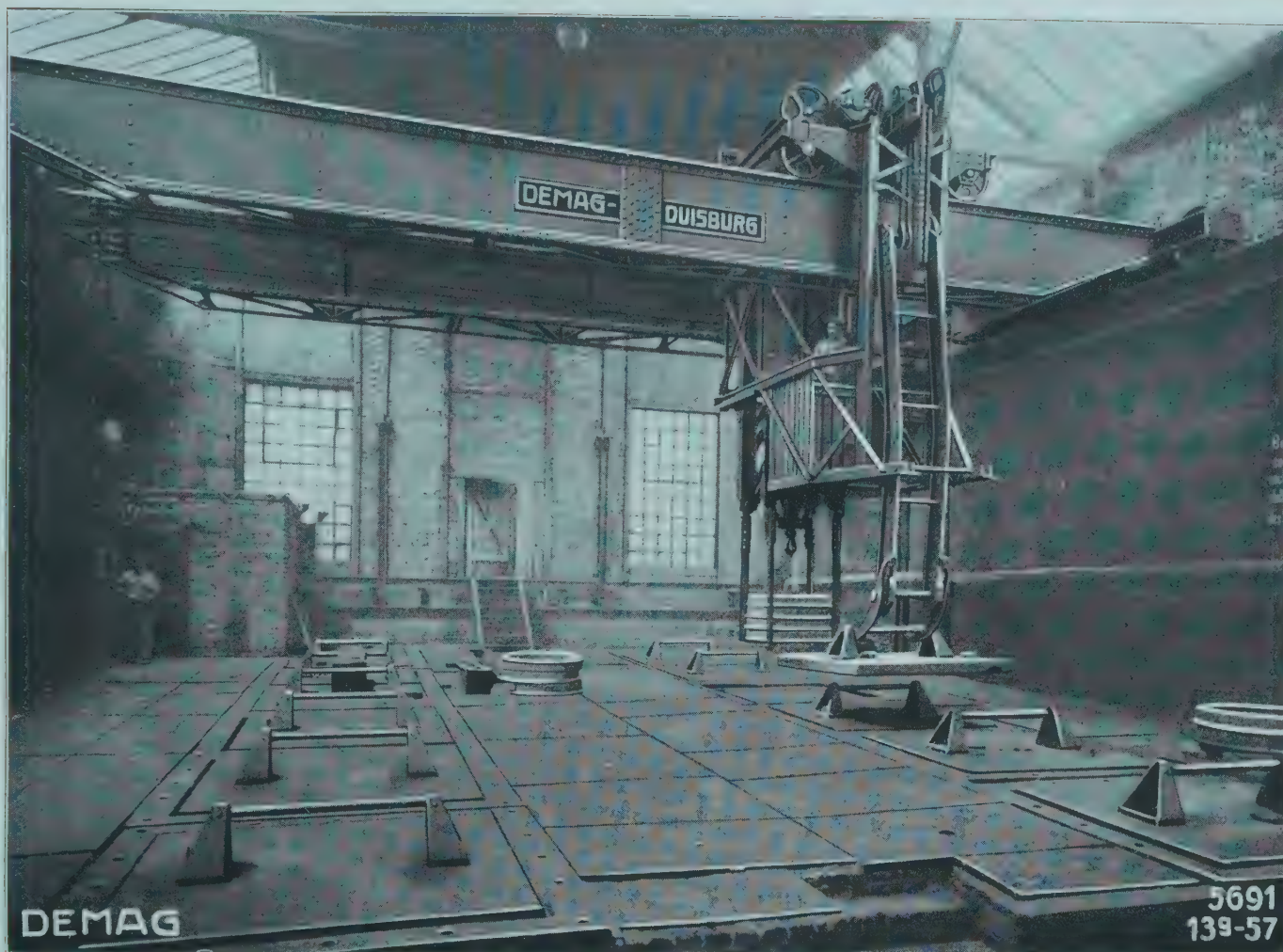


TWIN ROLLING MILL ENGINE FOR A DISC MILL, DIAMETER OF CYLINDER 600 mm., STROKE OF PISTON 940 mm., MAXIMUM NUMBER OF REVOLUTIONS 125 PER MINUTE

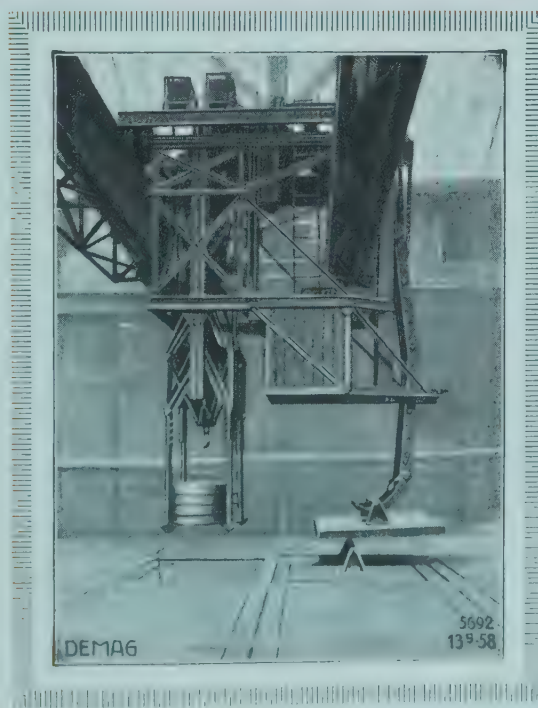
Disc mill with electric drive, the conical rolls adjusted by electricity on the Demag patent system. / Delivered for the Rheinischen Stahlwerke, Akt.-Ges., Duisburg-Meiderich.







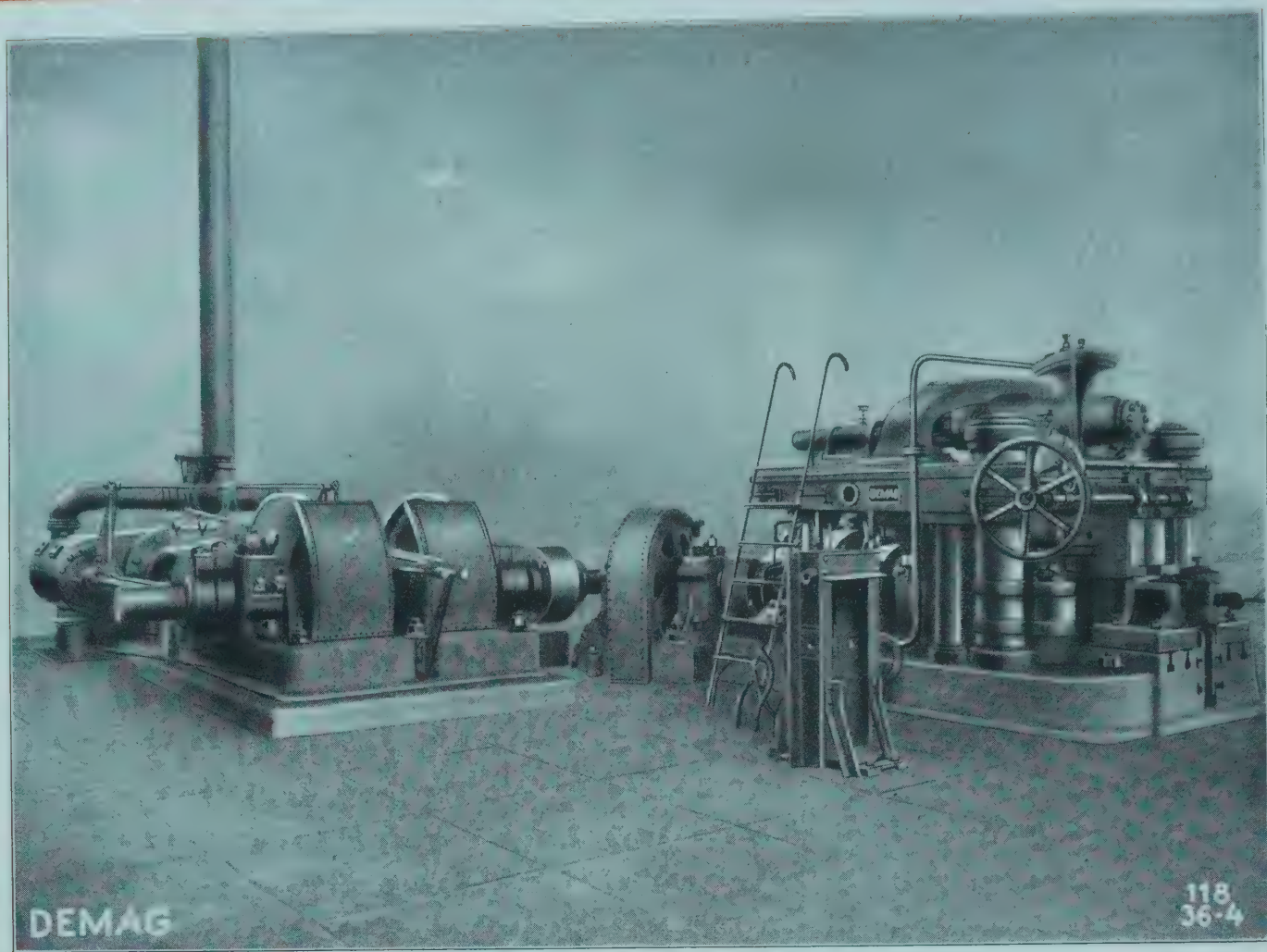
SPECIAL TYRE SOAKING PIT CRANE WITH LID LIFTER / DELIVERED FOR HENSCHEL & SOHN, DEPARTMENT: HENRICHSHÜTTE, HATTINGEN AN DER RUHR



In the accompanying illustration the devices for lifting the lid of the

soaking pit and raising the tyres out of the pit are plainly visible.

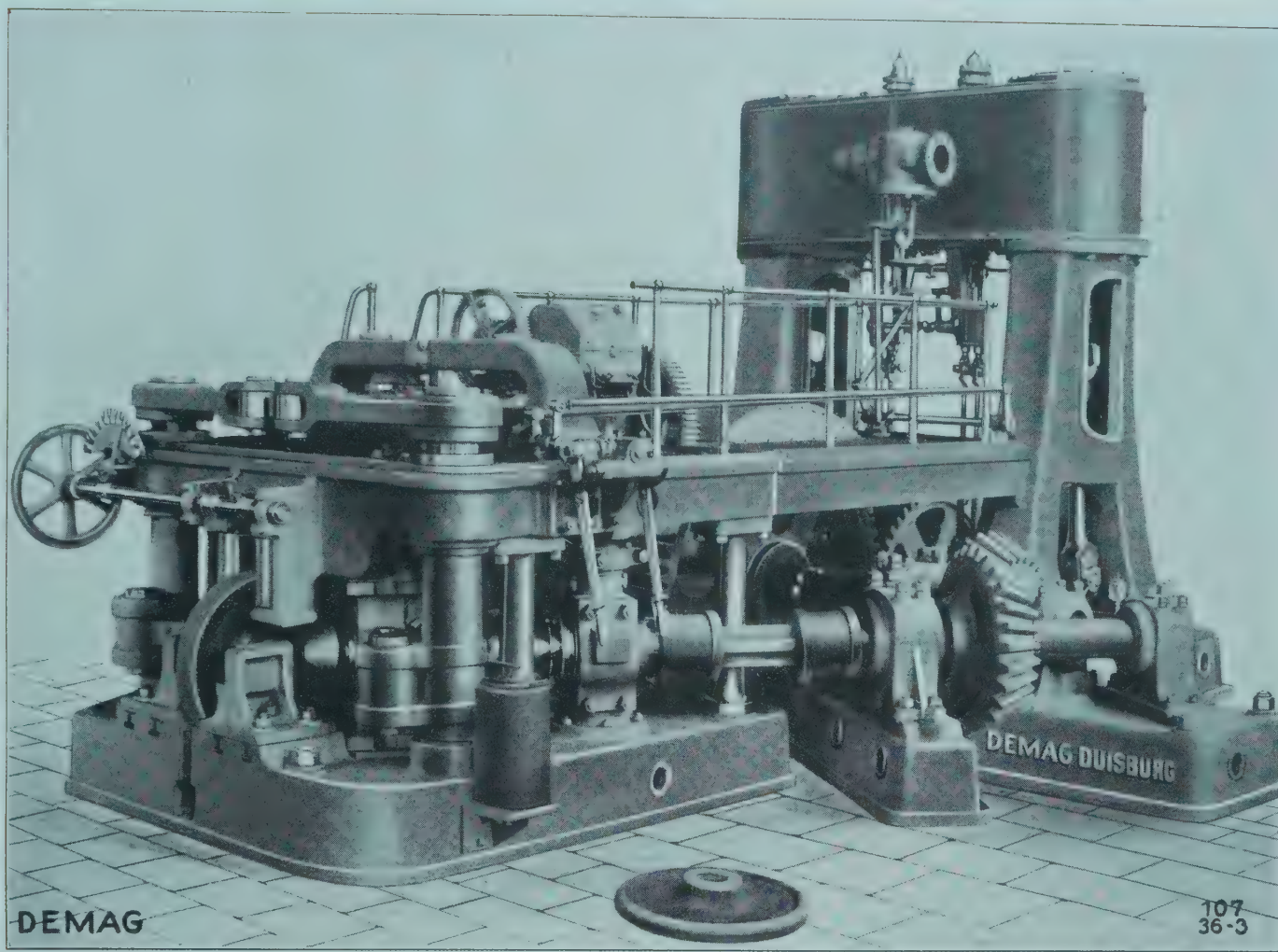




DISC MILL / DELIVERED FOR THE STAHLWERKE VAN DER ZYPEN  
UND WISSENER EISENHÜTTEN-A.-G., COLOGNE-DEUTZ

**T**he disc mill illustrated above is driven by a horizontal twin engine of 600 mm cylinder diameter, 940 mm stroke of piston and 120 revs. per minute, which was also constructed by us. The engine is fitted with expansion valve gear to be worked by hand, and with piston valves. The conical rolls are adjusted by hydraulic power on a system that is our patent.

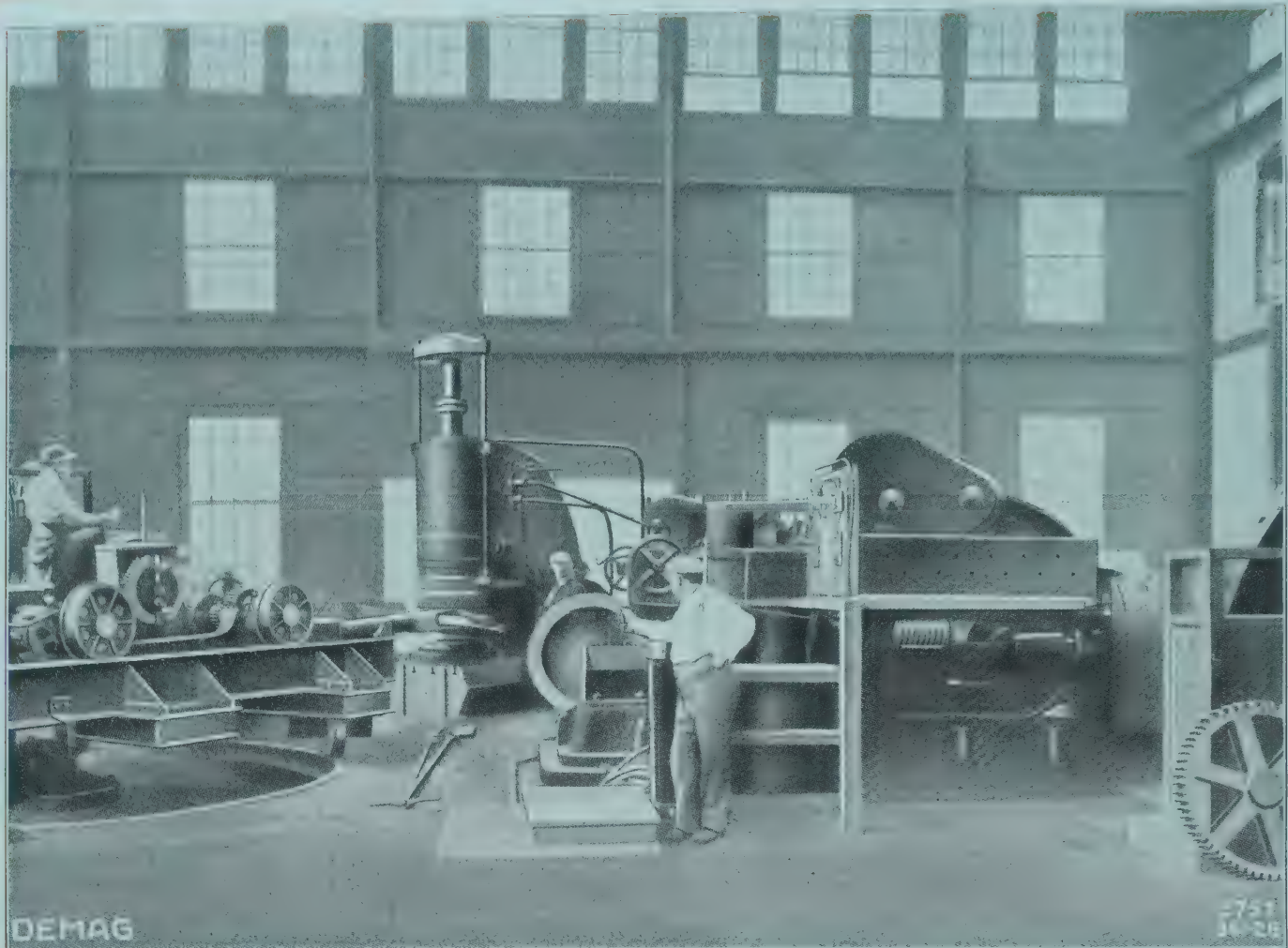




DISC MILL / DELIVERED FOR THE COMP. DES FORGES ET  
ACIÉRIES DE LA MARINE ET D'HOMÉCOURT, ST. CHAMOND

**T**he rolling mill is driven by a vertical twin steam engine, diameter of cylinder 600 mm, stroke of piston 600 mm and 150 revs. per minute, whilst the adjustment of the conical side rolls is regulated by an electric device patented by us. The rolls for working the edges of the discs are adjusted by hand by means of a worm gear.



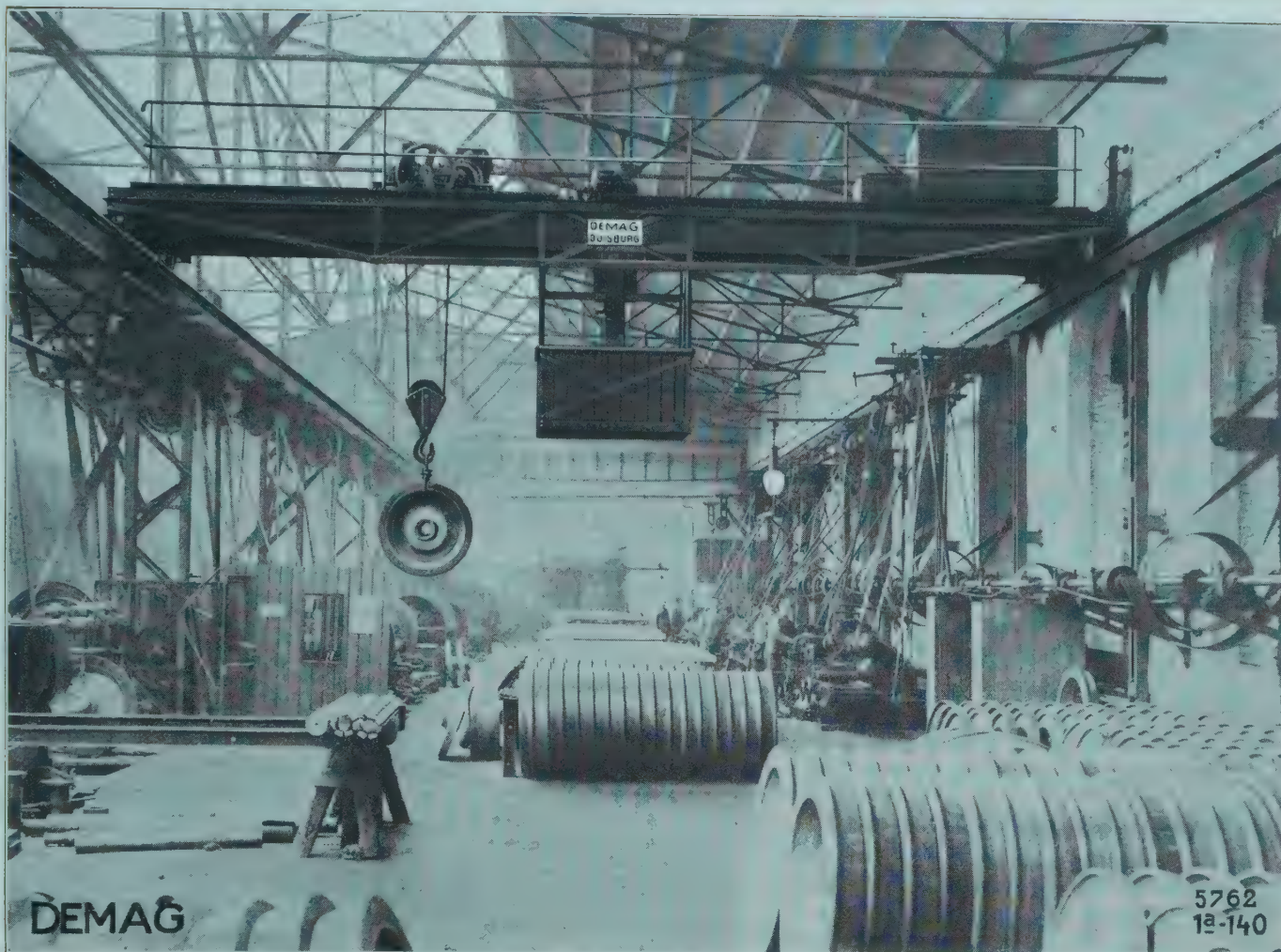


PLANT OF THE STANDARD STEEL WORKS AT BURNHAM,  
PENNSYLVANIA (U. S. A.) FOR MAKING DISCS

Views of the workshop for the above rolling mill  
plant. The rolling mill itself, which is driven by electricity, the conical  
rolls being also fitted with electric adjustment, was delivered by us.

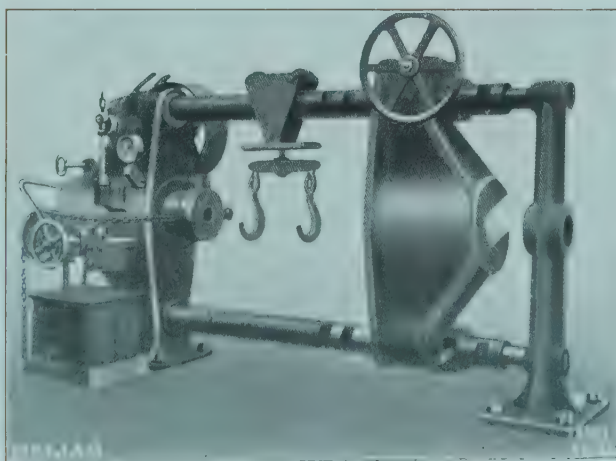






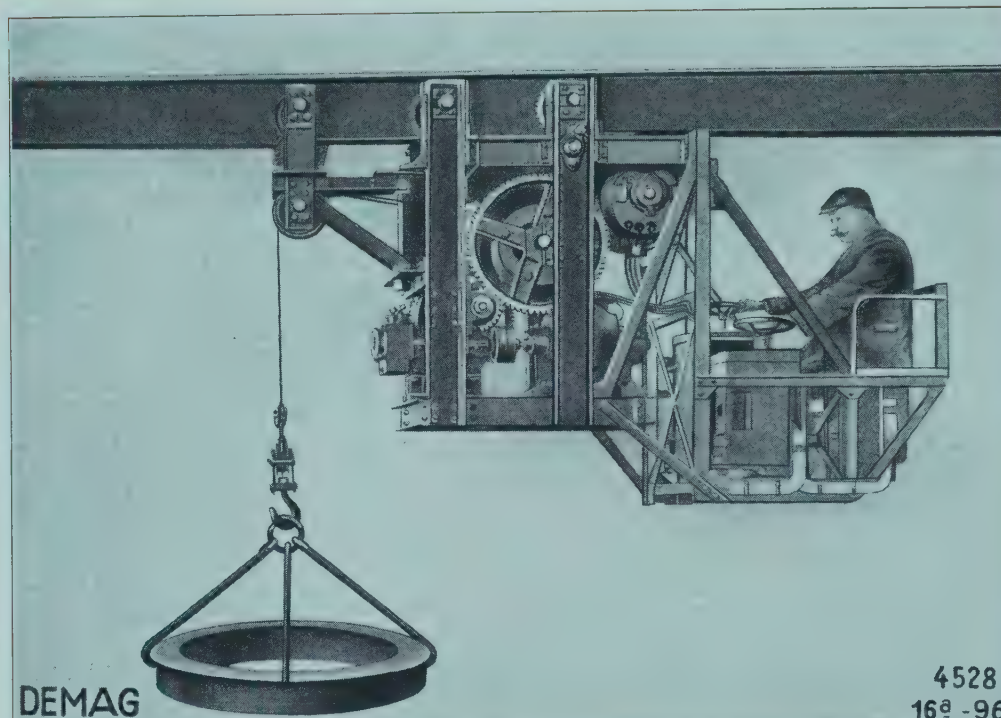
## FINISHING DEPARTMENT FOR PAIRS OF WHEELS IN A METALLURGICAL WORKS ON THE LOWER RHINE

The illustration below shows a hydraulic wheel fitting and axle withdrawing press with pump, for belt transmission. The machine is easy to attend to and works with great rapidity and reliability.





# MODERN TYRE AND DISC CONVEYANCE



**MONORAIL MOTOR CRAB**  
WITH DRIVER'S STAND ATTACHED AND WITH ELECTRIC  
LIFTING AND TRAVELLING GEAR

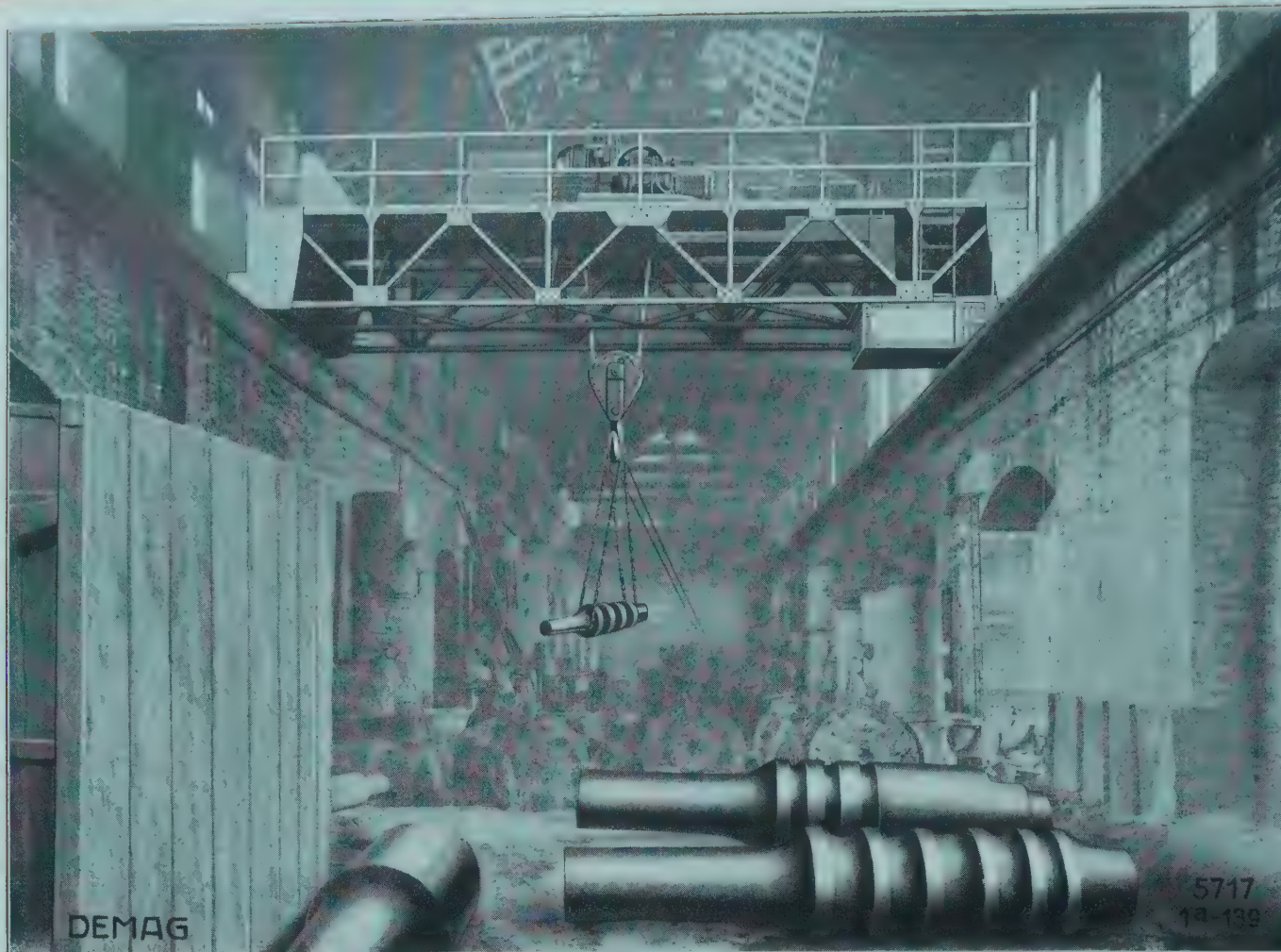


# THE ROLL FOUNDRY, TURNING SHOP AND MACHINE WORKS

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**T**he provision and maintenance of the necessary supply of rolls means the expenditure of considerable sums of money. Therefore it is easy to understand that efforts are made, not only to reduce the prime cost, but also to keep a supply of material that is good in every respect. Thus whole establishments were able to arise, that devote themselves almost exclusively to the manufacture of rolls. Most rolling mills have also added their own roll finishing workshop, either immediately alongside the rolling mill or in a special building, in which case it is generally connected with the repairing shop and the machine shop. We deliver cranes and all kinds of transporting devices both for the roll foundry and for the roll turning shop. The cranes differ very little from the usual types, and are as a rule noted only for their high lifting capacity and the exactitude with which they can be controlled. Besides the transporting devices we also deliver for the foundry cold saws of the heaviest type for cutting off dead heads, and for the turning shop lathes, especially those for very large outputs, suitable both for working graduated rolls and for smooth rolls, with or without roll polishing device. For machine shops we have also delivered cranes of the most varied descriptions, specially adapted to the purpose for which they were to be used, and these have stood the test in every respect. If in such workshops light loads frequently have to be transported it is advisable to make use of our electro pulley blocks; we are in a position to refer to quite a number of deliveries for this purpose. In addition to the necessary machine tools, sheet and profile iron finishing machines, such as shearing machines, saws, straightening and bending machines are used. A number of such machines have been illustrated in the foregoing pages, which are suitable for erection in the above-mentioned workshops. The illustrations on the following pages are only intended as supplementary.





**ELECTRIC OVERHEAD TRAVELLING CRANE IN THE ROLL  
FOUNDRY / DELIVERED FOR PEIPERS & CO., AKTIEN-  
GESELLSCHAFT FÜR WALZENGUSS, SIEGEN IN WESTPHALIA**

Electric cold saw of maximum output, with blade 1500 mm. in diameter, for cutting off the dead head of rolls and for cutting off large pieces of iron, steel, cast steel and cast iron. Delivered for our works at Benrath.

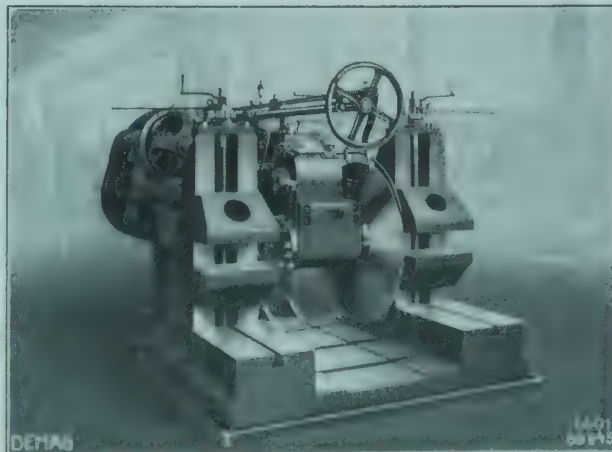




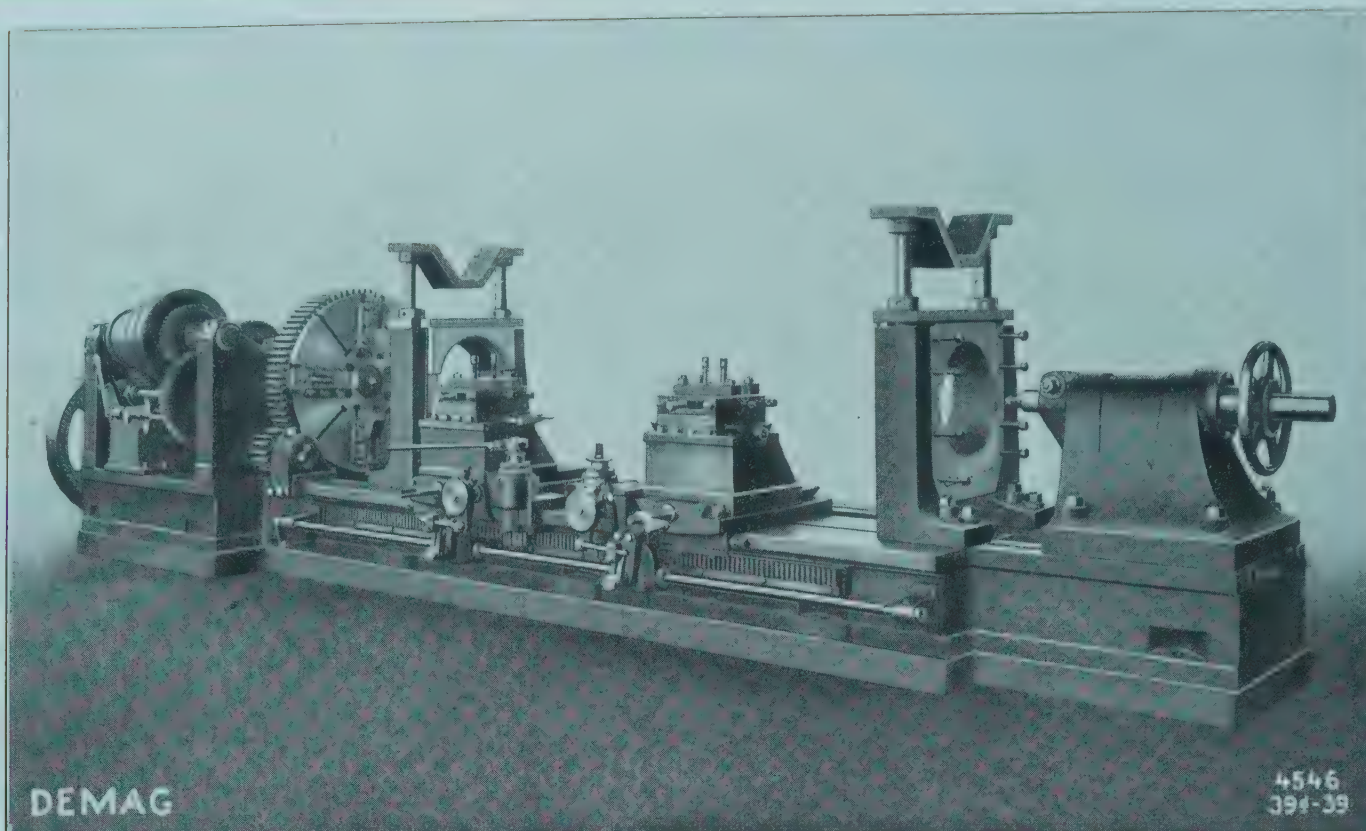


ELECTRIC OVERHEAD TRAVELLING CRANE IN THE ROLL TURNING SHOP / DELIVERED FOR PEIPERS & CO., AKTIENGESELLSCHAFT FÜR WALZENGUSS, SIEGEN IN WESTPHALIA

Cold saw with electric drive and with blade 1000 mm. in diameter, also fitted with elastic feeding device, German patent No. 253 014. The return stroke is effected mechanically or from the platform.



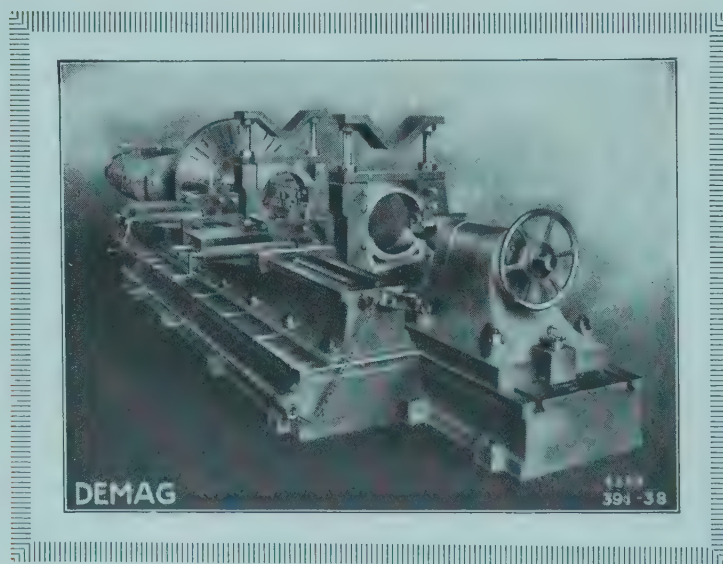




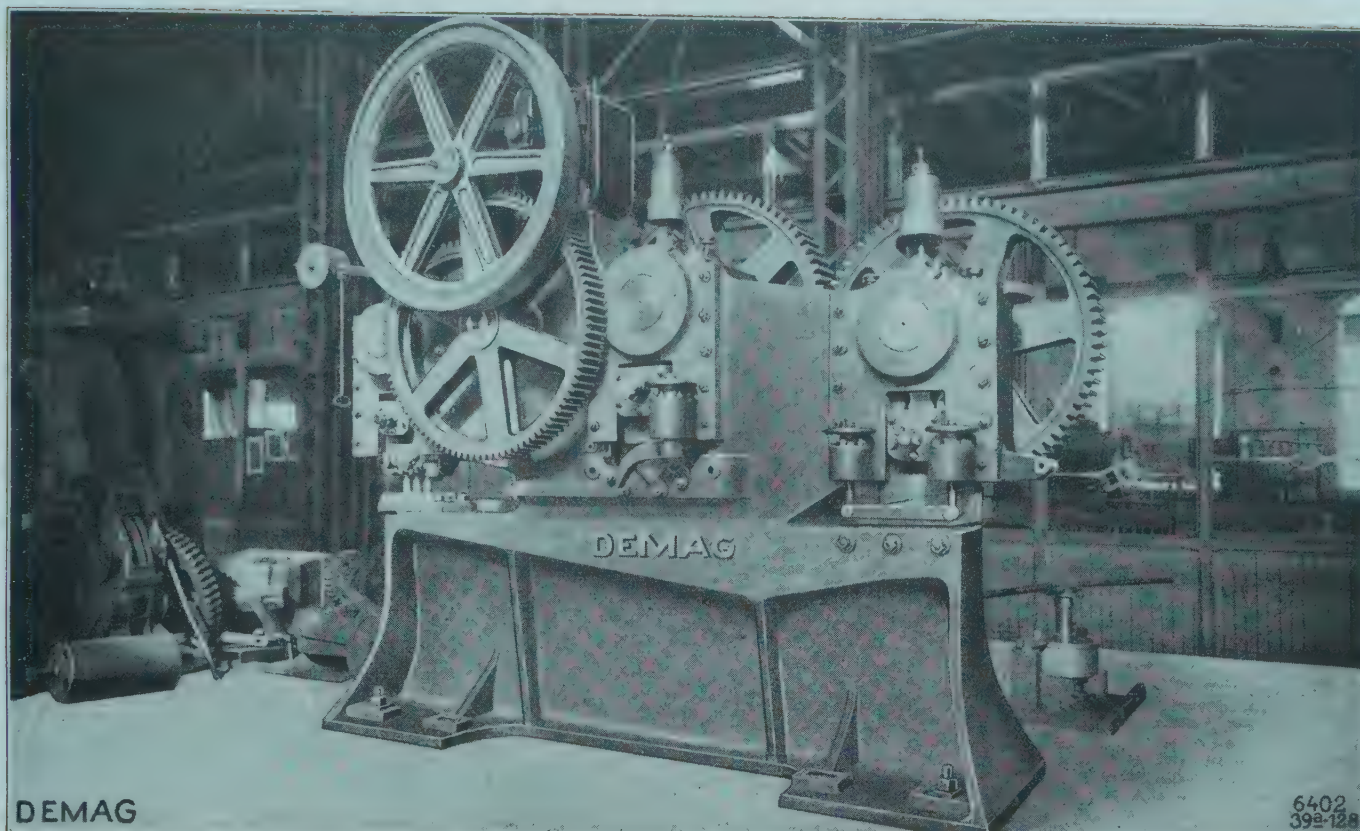
**HEAVY ROLL LATHE WITH TWO SUPPORTS AND BELT DRIVE ON CONE PULLEY WITHOUT FRONT CHEEK DELIVERED TO "MAXIMILIANSHÜTTE", ROSENBERG**

### **HEAVY ROLL LATHE WITH TWO SUPPORTS**

The roll lathe illustrated below, on a travelling front cheek and with gear case for electric drive serves for turning up sheet rolls and grooved rolls.



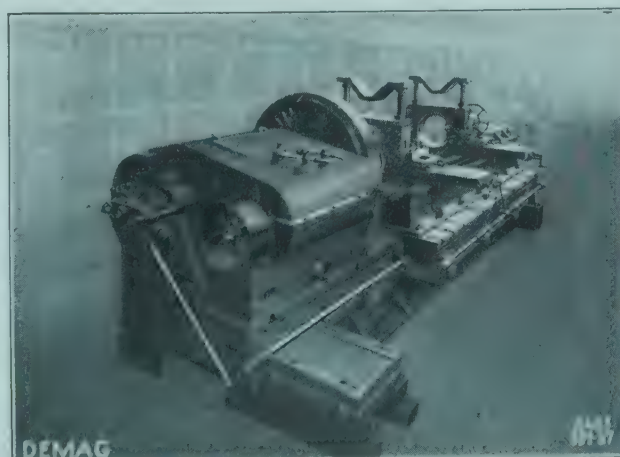




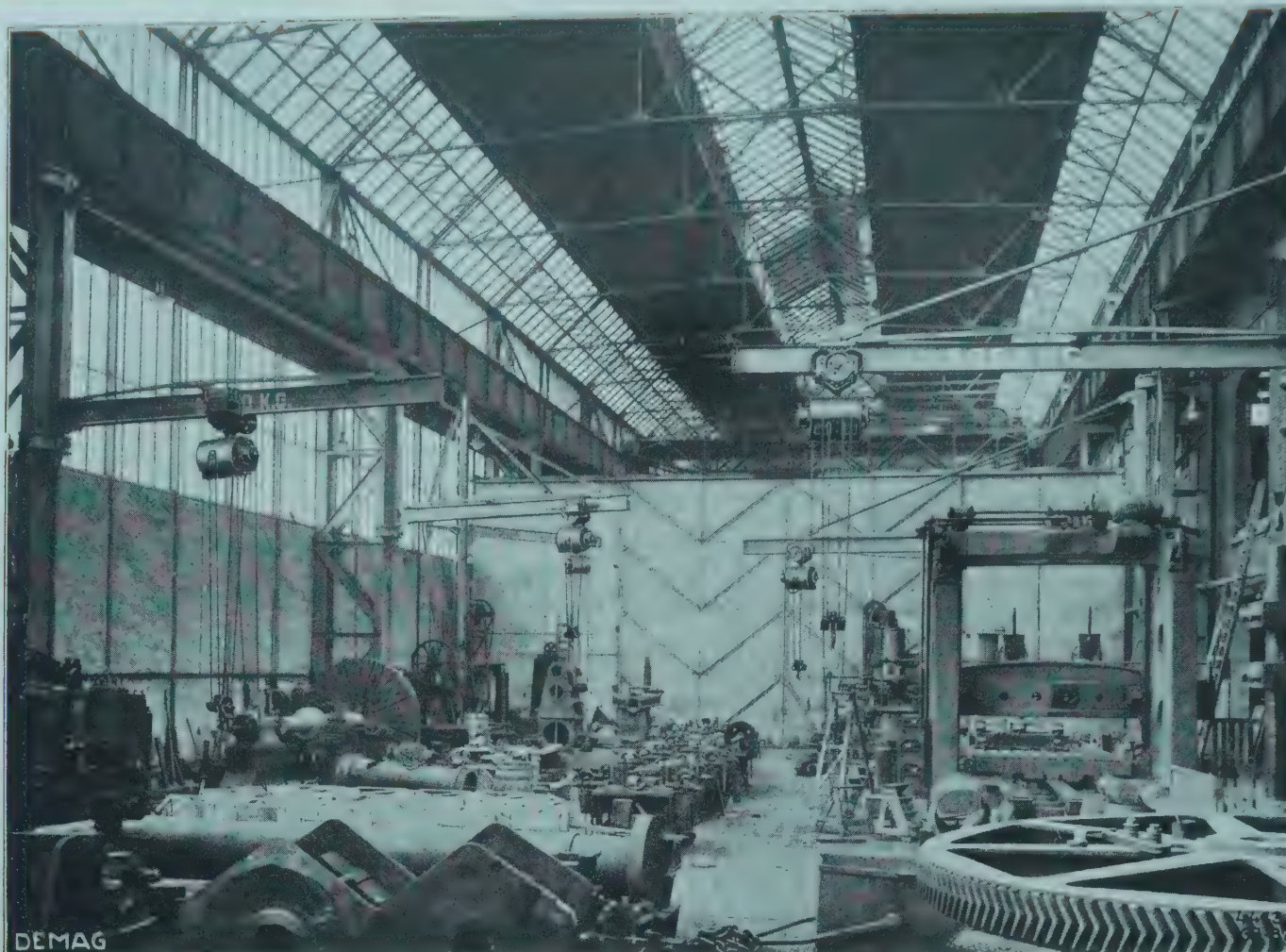
COMBINED SHEET SHEARING MACHINE, SECTION IRON SHEARING MACHINE AND PUNCHING MACHINE WITH DIRECT ELECTRIC DRIVE / SLIDE DISENGAGEMENT

## HEAVY ROLL LATHE WITH TWO SUPPORTS

The illustration below shows the same roll lathe as on the foregoing page, but seen from the head stock end. The whole of the gearing with all the change wheels is entirely enclosed.

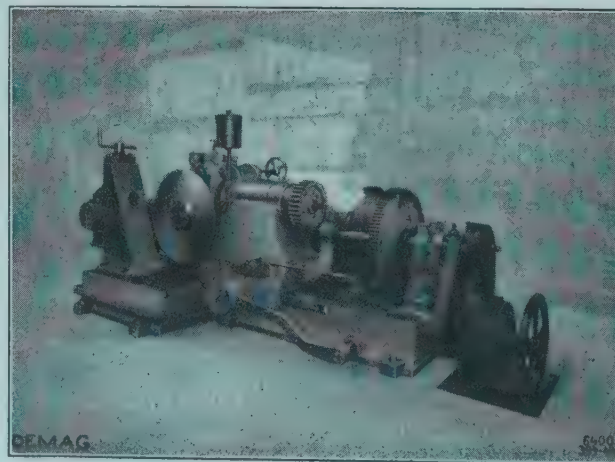




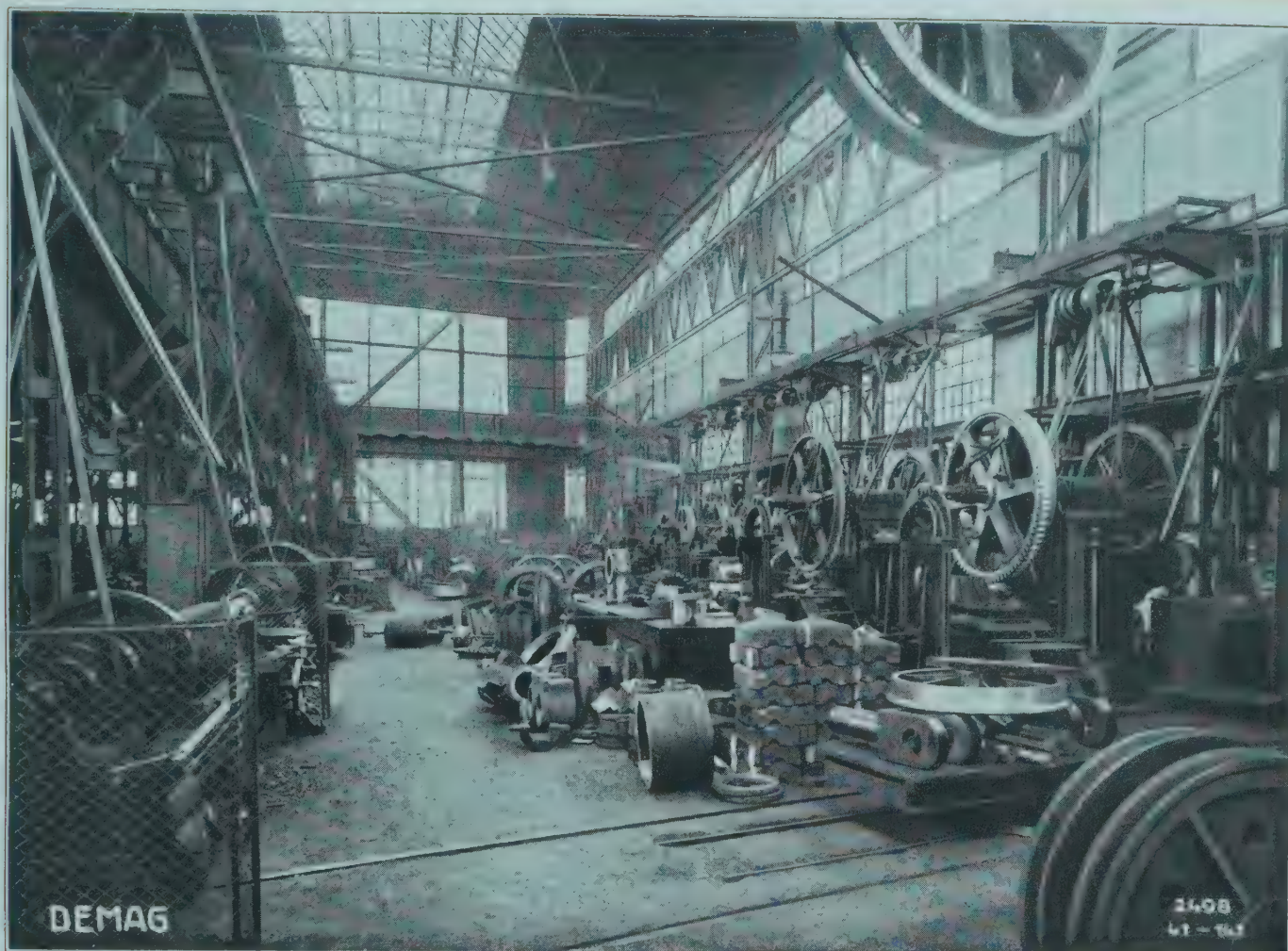


## MACHINE SHOP FITTED WITH 7 DEMAG ELECTRO PULLEY BLOCKS

**COLD SAW WITH DIRECT ELECTRIC DRIVE**  
The cold saw illustrated below, with a blade 1100 mm. in diameter, is intended for straight and mitre cutting and is fitted with elastic feeding device and mechanical return stroke.







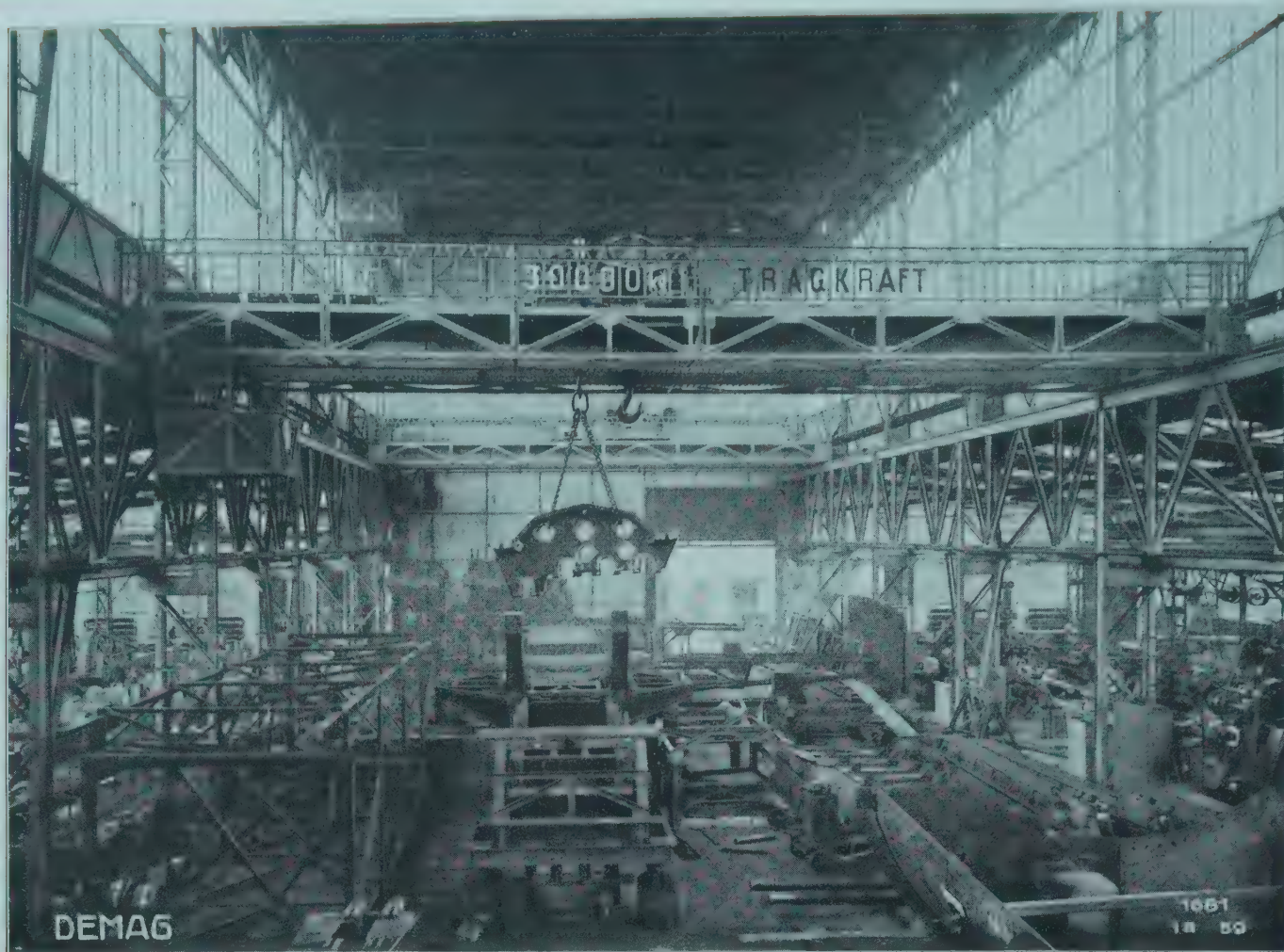
TURNING AND MILLING SHOP AT OUR  
WORKS AT WETTER ANDER RUHR

## CHAIN SMITHY AT OUR DUISBURG WORKS

For more than fifty years past the manufacture of chains has been one of our specialties. We make chains, shackles and swivels from the smallest dimensions to the largest anchor chains.







STANDARD ELECTRIC OVERHEAD TRAVELLING CRANE TO CARRY 30000 KILOS. AT OUR WORKS AT BENRATH nr. DÜSSELDORF

Standard electric overhead travelling crane to carry 4500 kilos. Delivered for the Königliche Eisenbahndirektion, Danzig.





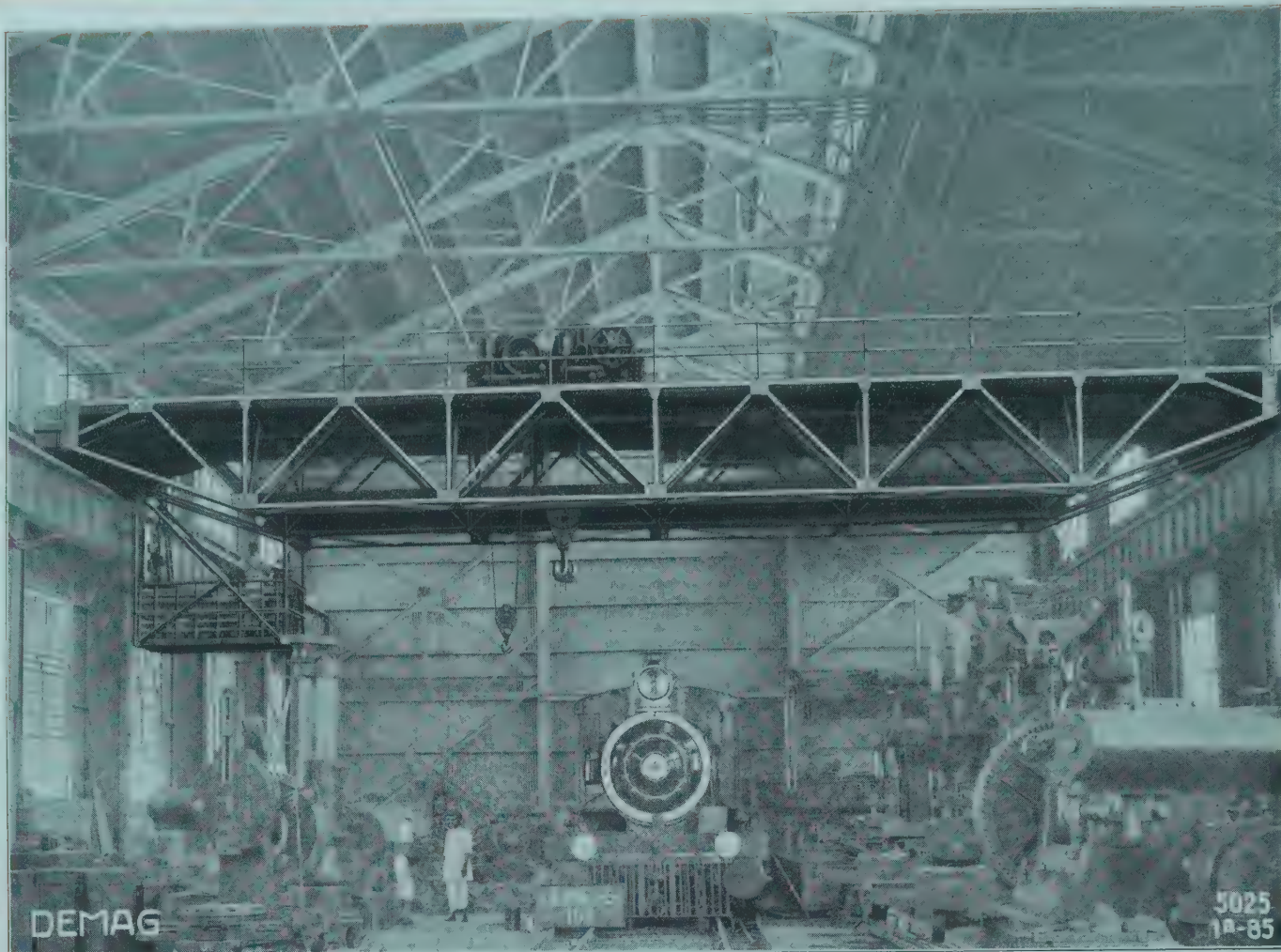


STANDARD ELECTRIC OVERHEAD TRAVELLING CRANE TO CARRY 40000 KILOS., AND OF 17.3 m. SPAN AT WESTFÄLISCHE STAHLWERKE, BOCHUM

Standard electric overhead travelling crane in the workshop of the Rheinische Stahlwerke, Aktien-Ges., Duisburg-Meiderich.







STANDARD ELECTRIC OVERHEAD TRAVELLING CRANE / DELIVERED FOR THE TATA IRON & STEEL CO., LTD., SAKCHI KALIMATI (INDIA)

A few of the advantages of our standard electric overhead travelling cranes: Highest degree of safety in working and absolute security against breakage, substantial and powerful construction, free and unimpeded view for the attendant over the load in any position and over the whole of the working area of the crane, handy arrangement of the controlling apparatus etc.





# ELECTRIC BRACKET



**CRANE WITH SLEWING JIB**  
DELIVERED FOR THE MACHINE TOOL WORKS OF ERNST  
SCHIESS, AKTIENGESELLSCHAFT IN DÜSSELDORF



# DEMAG LIFTING MAGNET



LOADING CHIPS FROM THE  
TURNING SHOP



# THE MANUFACTURE OF TOOTHED WHEELS IN OUR WORKS AT WETTER

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**T**he manufacture of smooth running and exactly cut toothed wheels the various descriptions of which, such as spur, bevel, helical and worm wheels, are used for so many purposes in machine construction, is a branch of manufacture which has aroused the greatest interest on every hand. In many branches of machine construction a high number of revolutions and great strain on the gearing have to be taken into account, a fact which calls for exact pitch and shape of the teeth. Slight inequalities in the pitch and incorrect shape of the teeth lead to disturbing sounds and jerks when running with a large number of revolutions, and to increase in the power consumption and greater wear and tear. In rolling mills, where a large number of equal bevel wheels are required, as for instance for roller gears, it is very necessary to have spare bevel wheels always in stock, which must be very exact, in order to secure uniform working of the roller gears and so to attain a high degree of sensitiveness with the least possible consumption of power. It is therefore of great importance when buying toothed wheels not to think too much of cheapness, but above all, of exact workmanship. Our toothed wheel factory, which is fitted to perfection, enables us to deliver cut toothed wheels up to 4 metres in diameter with any number of teeth and any ordinary pitch at short notice, from models in stock, of theoretically correct workmanship, milled by the rolling process.

The following illustrations show a few of the shapes of wheels made by us, and for further particulars we refer to our special catalogue on toothed wheels.

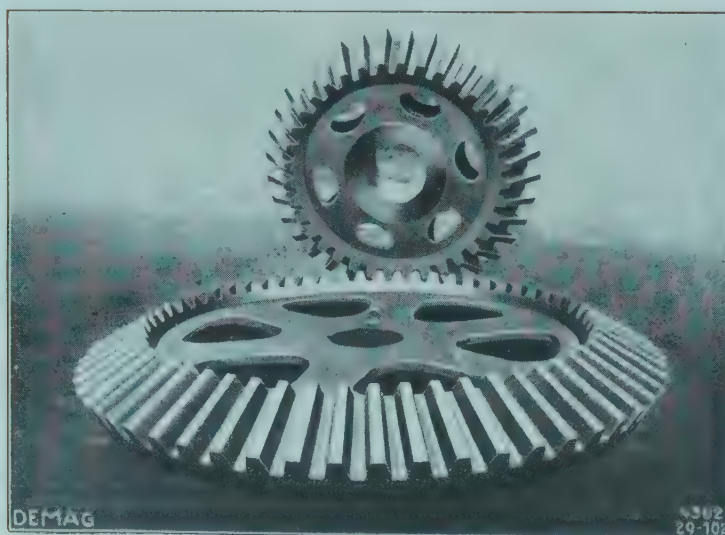




OUR DEPARTMENT "TOOTHED WHEEL FACTORY" AT WETTER A. D. RUHR

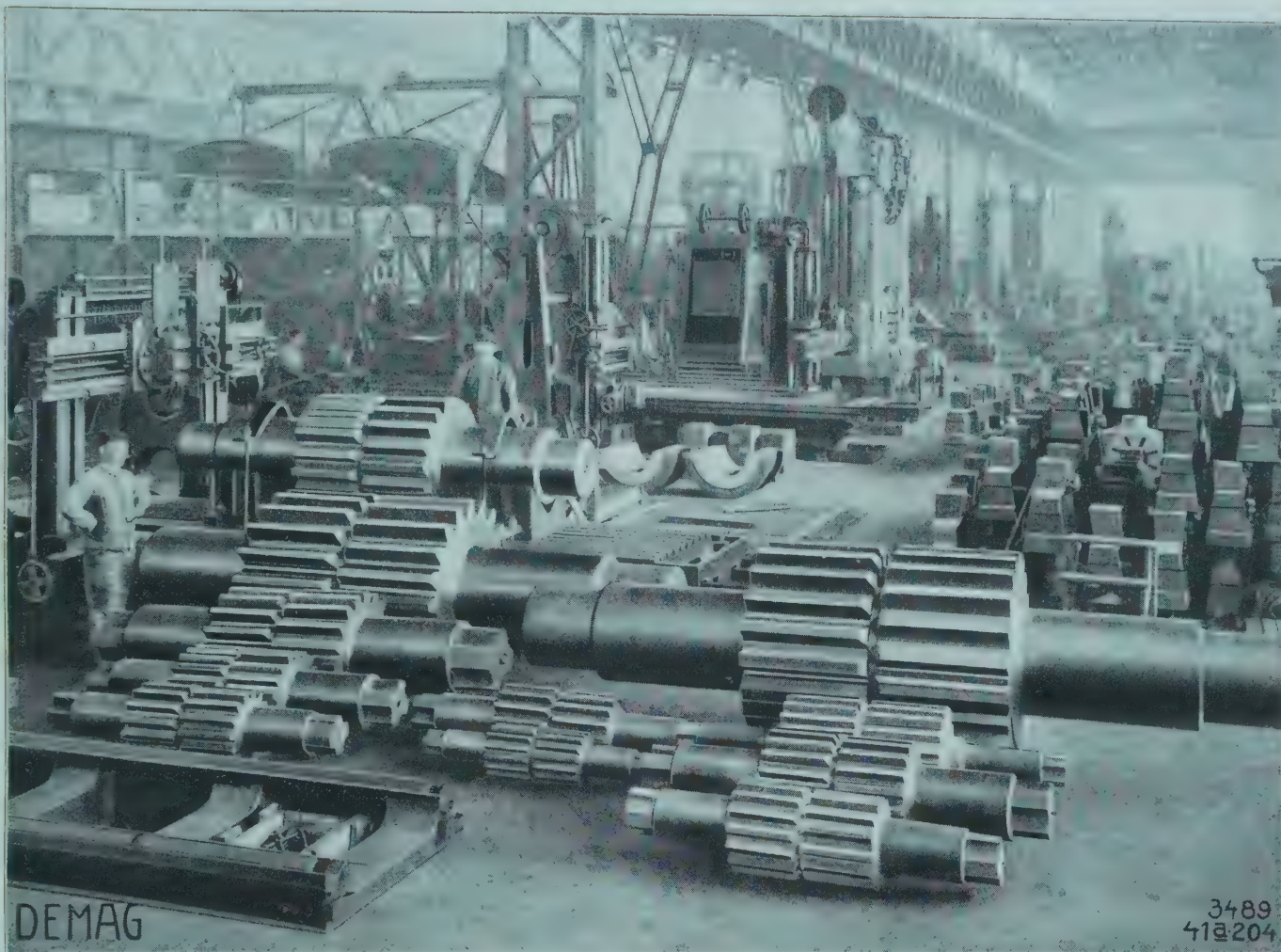
**I**n addition to standard spur wheels and those with staggered teeth we also deliver of best workmanship and at a fair price: Bevel wheels, helical wheels and worms, as well as complete worm gears including casing, besides pinions, spur and bevel wheels with single and multiple helical teeth, with two rows of teeth displaced by half a pitch, and spur wheels with screw teeth for shafts crossing each other in two directions.

Bevel wheel  
gear of cast  
steel, milled



teeth, for dri-  
ving a univer-  
sal rolling mill.





WORKING FORGED PINIONS IN THE  
DEPARTMENT OF OUR WORKS AT DUISBURG  
FITTED WITH SPECIAL MACHINES

The accompanying  
illustration shows  
pinions with double  
helical teeth cut from  
the solid wheel.

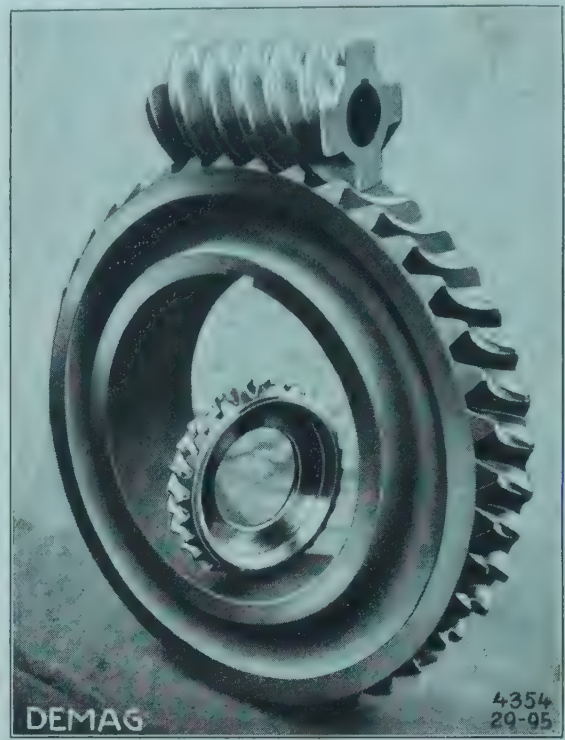


We also deliver  
pinions with single  
helical teeth  
cut from the  
solid wheel.





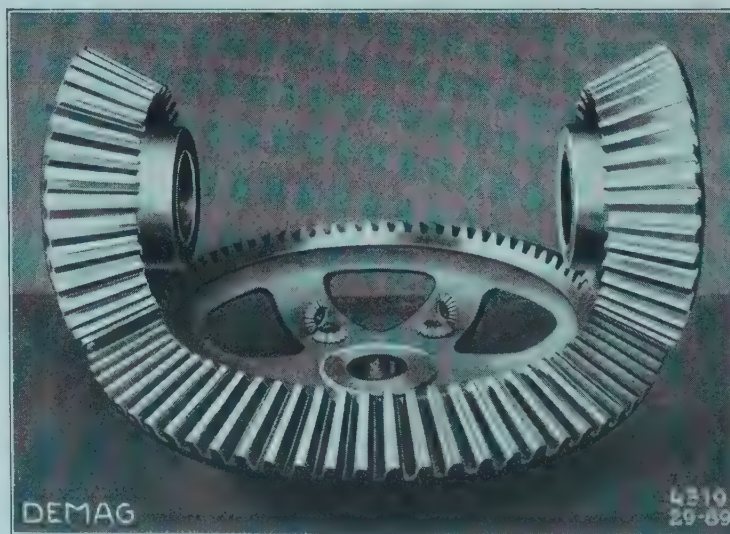
**CAST STEEL BEVEL WHEEL  
2200 mm. IN DIAMETER  
WIDTH OF TOOTH 280 mm.**



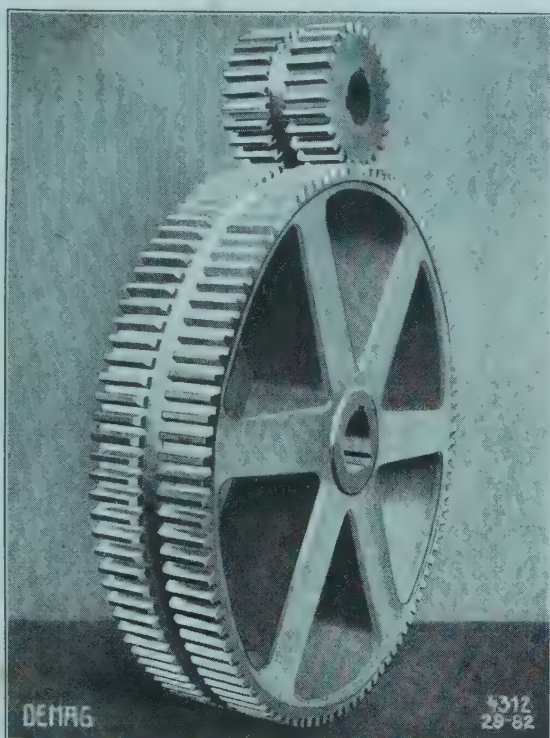
**WORM GEAR FOR  
DRIVING A GUN  
BORING MACHINE**

## **BEVEL WHEELS FOR DRIVING THE VERTICAL ROLLS OF A UNIVERSAL ROLLING MILL**

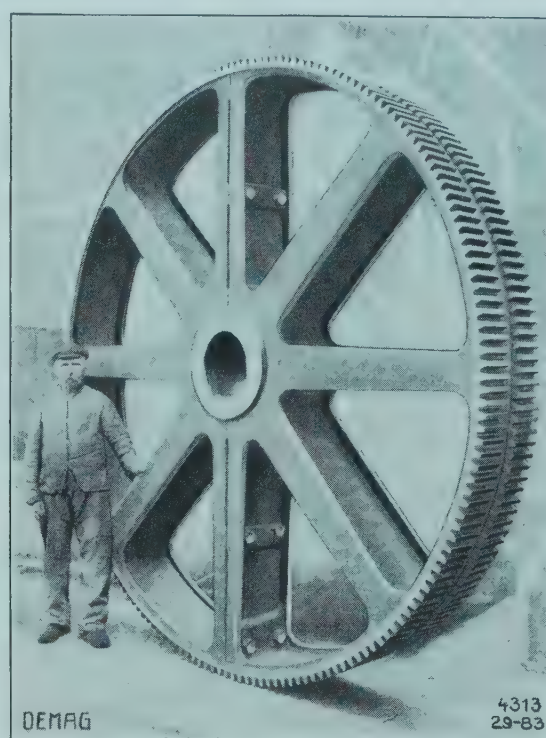
Our special machines allow of the teeth to be planed in spite of  
the large nave projecting almost up to the teeth.







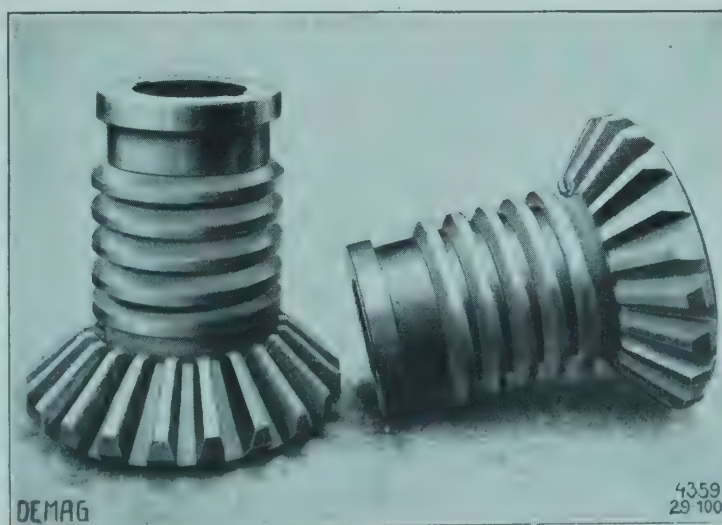
HIGH SPEED PAIR OF  
SPUR WHEELS WITH  
DISPLACED TEETH



LARGE TWO-PART  
CAST STEEL SPUR WHEEL  
WITH DISPLACED TEETH

## FORGED STEEL BEVEL WHEELS FOR DRIVING THE VERTICAL ROLLS OF A UNIVERSAL ROLLING MILL

Our special machines permit the planing of the teeth in spite of  
the large nave projecting almost up to the teeth.





# PINION RINGS



FROM A PHOTOGRAPH  
TAKEN IN OUR WORKSHOP



# OUR PRINCIPAL MANUFACTURES

## 1. Installations for mines, quarries and tunnelling

### Hauling plants:

Automatic pit cage charging devices.....  
Automatic air locks.....  
Cage connections.....  
Chains.....  
Chain railways.....  
Circular waggon tips.....  
Coal stampers for coke ovens  
Coke pushers.....  
Coke unloading and loading plants.....  
Hauling engines with steam drive.....  
Hauling engines with electric drive and Köpe's pulley..

Hoists.....

Lift frames.....

Pit cages.....

Rope clamps.....

Rope sheaves with wrought iron rim.....

Setting-up devices for pit cages

Shaft frames.....

Winding engines.....

### Compressed air plants:

Caulking hammers.....

Compressors.....

Compound compressors....

Compressed air locomotives

Hammer drills.....

High pressure compressors.

Large compressors.....

Long wall cutting machines.

Percussion drills.....

Pick hammers.....

Pillar coal cutting machines.

Pneumatic rammers.....

Ratched columns.....

Riveting hammers.....

Rotary compressors.....

Sharpening machines for rock drills.....

Stone splitting hammers....

Turbo-compressors.....

Upsetting machines for rock drills.....

Vacuum pumps.....

## 2. Blast furnace plants

Air heaters.....

Automatic charging installations.....

Blast furnace structures....

Blast furnace shells.....

Blowing engines.....

Bunker plants for ore and coke

Casting bed cranes.....

Casting machines.....

Feed cars.....

Granulation plants for blast furnace slags, patent Buderus.....

Hopper turning gears.....

Inclined hoists, specialty: Stähler & Benrath system

Loading plants for ore and coke.....

Molten metal cars.....

Pig iron breakers.....

Pig iron loading cranes with lifting magnets.....

Slag cars.....

Skull cracker cranes.....

Structural steel work.....

Throat gas cleaning plants..

Throat stoppers.....

## 3. Steel Works appliances for Open-Hearth and Basic Steel Works as well as Electro Steel Works

Bottom tamping machines for converters.....

Bottom relining machines for converters.....

Blowing engines.....

Box transporting cranes....

Casting cranes.....

Charging cranes for open-hearth furnaces.....

Converters.....

Dolomite plants.....

Electric steel furnaces.....

Flat hearth mixers.....

Ingot stripping cranes.....

Ingot transporting cranes with tongs and magnets..

Ladle cars of all designs....

Mixers cranes.....

Open-hearth charging cranes and machines.....

Rotary mixers.....

.....

Runner breakers.....

Scrap bundling presses with electric drive.....

Scrap transporting cranes with lifting magnets.....

Skull cracker cranes with lifting magnets.....

Soaking pit cranes.....

Structural steel work.....

Tilting and stationary open-hearth furnaces.....



## 4. Rolling mill plants

Armour plate rolling mills..  
Bending machines .....  
Billet rolling mills.....  
Claw cranes.....  
Cold rolling mills .....  
Continuous tube rolling mills  
Continuous rolling mills....  
Corrugated tube rolling mills  
Disc rolling mills.....  
Drawing benches.....  
Finishing machines.....  
Gantry cranes.....  
Hardened steel rolls .....  
Hoop-iron spools.....  
Hot banks.....  
Ingot charging cranes .....  
Ingot pushing devices.....  
Ingot rolling mills.....  
Ingot shears.....  
Ingot tilting devices .....  
Lifting tables .....

Loading cranes.....  
Magnet cranes .....  
Oscillating tables .....  
Overhead travelling cranes .  
Pilgrim tube rolling mills...  
Piercing mills .....  
Plate rolling mills .....  
Plate shears .....  
Plate straightening machines  
Power levers .....  
Punching machines.....  
Rail drilling and milling ma-  
chines.....  
Reducing rolling mills .....  
Roller gears.....  
Rolling mills for thin sheets  
Rolling mills for rolled sec-  
tions .....  
Roller tables .....  
Rolling mills for lapwelded  
tubes.....

Rolling mill engines .....  
Roll exchanging cranes .....  
Roll turning lathes .....  
Saws .....  
Shears.....  
Sheet billet cooling devices..  
Sheet billet rolling mills.....  
Shifting apparatus for blooms  
etc.....  
Slab rolling mills.....  
Slewing cranes .....  
Sleeper capping and punching  
machines .....  
Soaking pit cranes .....  
Straightening machines .....  
Tilters .....  
Tube rolling mills .....  
Tyre rolling mills.....  
Universal rolling mills .....  
Wire rolling mills .....  
Wire spools .....

## 5. Ship-yard plants

Boat cranes.....  
Caulking hammers.....  
Chains .....  
Compressors.....  
Cranes for dry and floating  
docks .....  
Crane ships for salvage pur-  
poses .....  
Floating cranes.....

Forging presses.....  
Giant cranes .....  
Lifting ships for submarines  
Lock-gates.....  
Riveting hammers .....  
Riveting machines.....  
Shipbuilding slips .....  
Shipbuilding cranes.....

Shipbuilding machines .....  
Slipways for hauling vessels  
Steam cranes.....  
Steam hammers .....  
Structural steel work.....  
Tower slewing cranes, statio-  
nary and travelling.....  
Warping capstans.....

## 6. Harbour installations and store-yard equipments

Bridges, movable .....  
Buckets with hinged bottom  
Capstans .....  
Coaling installations .....  
Floating cranes.....  
Grabs for ore and coal.....

Harbour cranes .....  
Landing bridges.....  
Loading bridges in connec-  
tion with ropeways and  
electric telferages .....  
Shunting winches.....

Steam cranes.....  
Suspension bridges.....  
Tilting turntables .....  
Travelling platforms .....  
Turntables.....  
Waggon tips .....

## 7. Installations for workshops, foundries, engine houses etc.

Bracket cranes .....  
Casting cranes.....  
Chains .....  
Cupola furnaces.....  
Cupola furnace hoists.....  
Eccentric presses .....  
Electric pulley blocks.....  
Forging cranes.....

Forging presses.....  
Forgings.....  
Foundry installations.....  
Gear wheels.....  
Hoists .....  
Lifting magnets.....  
Motor travelling hoists.....  
Overhead travelling cranes..

Slewing cranes, stationary  
and travelling.....  
Spindle presses.....  
Steam hammers.....  
Starting devices for gas engi-  
nes and electric motors..  
Structural steel work.....  
Velocipede cranes.....







5439







